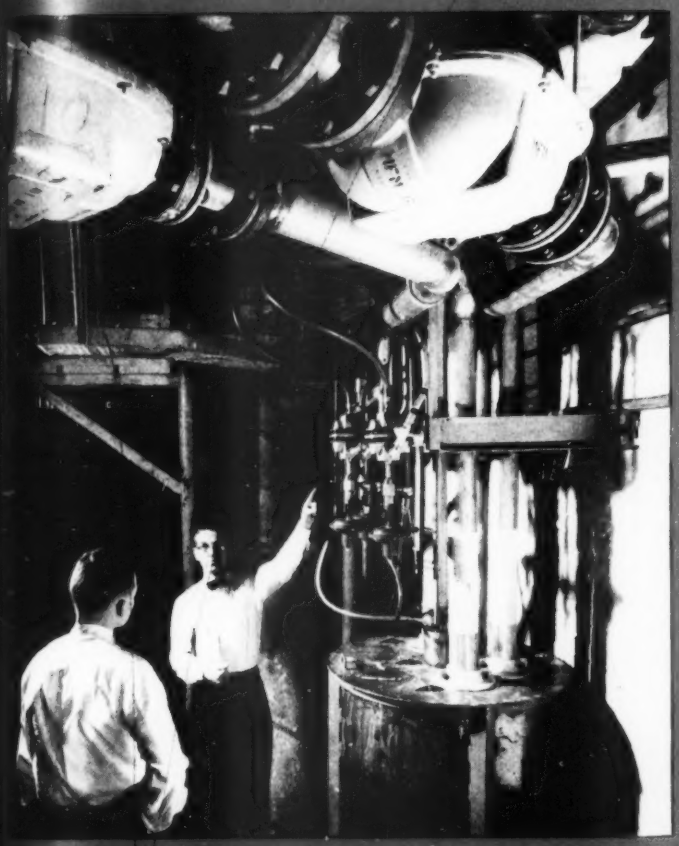
MAY 1960

The Paper Industry



Stainless steel hopper, dye flow meters and magnetic meters proportion stock at S. D. Warren's Control Mill.

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TECHNOLOGY DEPARTMENT

- S. D. Warren's stock proportioning system
- Paper mill lubricants
- Pipe, fittings, valves and pumps in pulp bleaching
- Pressure sensitive adhesives

Publishers of PAPER AND PULP MILL CATALOGUE

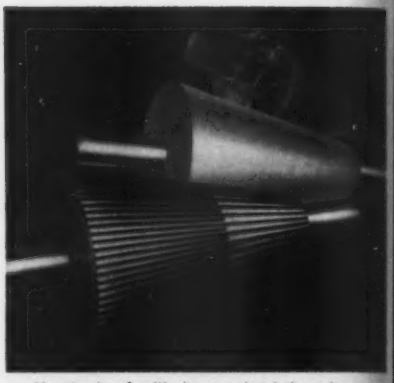
ONLY EMERSON WEDGELESS PLUGS CAN PASS THIS TEST

- because only Emerson Plugs have these design advantages!

Before You Buy Another Jordan Plug
Check the Answers to these Questions

Question	Emerson Wedgeless Plugs	Other Plugs
Are plugs available in stainless steel?	YES	NO
Are plugs easy to strip and fill because of bandless construction and only one knife to a slot?	YES	NO
Can a full range of knives — both single and duplex — be used interchangeably in the same plug?	YES	NO
Does the design provide impact cushions between the base of the knives and the bottom of the slots?	YES	NO
Is there ¾" of wear depth available on all knives for long periods of Jordaning?	YES	NO
Can used plugs be jacketed with stainless steel?	YES	NO
Do bars have the advantage of Microlyzing based upon 40 years experience in custom heat treating?	YES	NO

These exclusive features are found *only* in Emerson Wedgeless Plugs. In addition, the unique design of Emerson Plugs gives you precision milled, equally-spaced slots so that when the plug is filled, *all* stock gets thorough, uniform treatment over the entire plug surface. Metal-to-metal contact in the slots adds strength and supports the knives their entire length.



Hundreds of mills have gained the advantages of Wedgeless Plug design by having their used plugs jacketed with Stainless Steel through Emerson's patented process.

DURABILITY UNMATCHED

When it comes to wear resistance and durability, try matching the high tensile strength of materials used in Wedgeless Plugs with those of other plugs: Special Stainless Steel — 125,000; Fabricated Steel — 75,000; Cast Iron — 57,500. For additional plug strength, a hammered forged steel shaft is pressed into the Emerson plug body under 60-ton hydraulic pressure. No wonder Emerson Wedgeless Plugs are stronger — more durable and serviceable than any other plugs — and specified by more papermakers.

Over thirty years ago Emerson Wedgeless led the field in Jordan plug design. It still leads today. It has never been equalled. Use Emerson Wedgeless Plugs. Buy the best. Save money, time and trouble. You have a choice of cast or fabricated plugs . . . Stainless Steel Jacket on Cast Steel body . . . Stainless Steel Jacket mounted on your old plug. *And remember, of the hundreds of used plugs jacketed with stainless steel,* ***not one has ever failed in service.*** For full information, write.

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TRADE MARK

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Division of John W. Bolton & Sons, Inc.
Lawrence, Massachusetts

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RCI WETstrez Wet Strength Resins

WETstrez is RCI's new name for a group of highly efficient wet strength resins — formerly RCI BECKAMINE — that have years of proven performance in the paper industry.

Take WETstrez P-841-30. This modified urea-formaldehyde resin is specially tailored for use with deciduous wood pulps. WETstrez P-841 imparts wet strength, increases Mullen and dry tensile strengths, and aids in the retention of clay, starch and other beater additives.

Or, WETstrez P-682-35, another modified U-F resin. It is designed for optimum performance with coniferous wood pulps. In either product, the name WETstrez means more wet strength per dollar!

Write today for the Paper Division's booklet on these and other RCI paper chemicals.

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Pentaerythritol • Pentachlorophenol • Sodium Pentachlorophenate
Sulfuric Acid • Methanol

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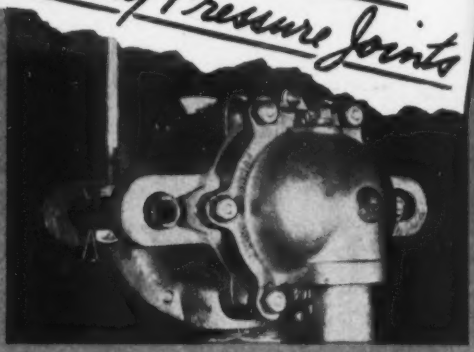
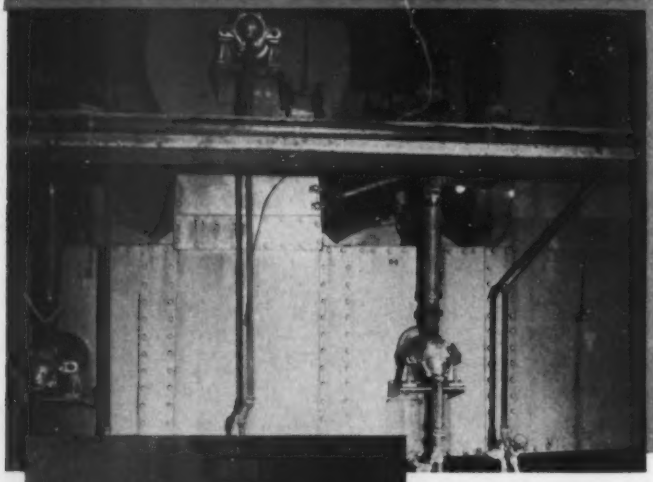
Rebuild it Right!

All dryers on paper machine shall be equipped with Johnson Rotary Pressure Joints





Two more rebuilt right!

Pictures at top show some of the 34 Type L-N Johnson Joints on rebuilt paper machine. Designed for use with rotating syphon pipe—makes it an integral part of rotating assembly. Simple support rods carry weight of joint and piping, permit rotating assembly to "float" freely inside. Note how joints are suspended from angle iron framing on this exposed-gear machine.

At left, some of 58 more Type L-N Johnson Joints on rebuilt Rice-Barton high speed, high pressure paper machine. These are long-wearing, low-friction "Super" construction, which combines rock-hard "Green Streak" seal rings with special Ni-Chrome plating on wearing surfaces. Note special support stands furnished by Johnson for this enclosed-gear machine.

There's hardly anything else you can specify when modernizing a paper machine that will bring greater reward for every dollar spent.

Johnson Joints are much more than just a better way to get steam into dryer rolls. Johnson engineering long ago opened the door to greatly improved methods of syphon drainage; important victories over friction and wear; and higher operating speeds and pressures.

Johnson Joints are available for all paper machines—rotating or stationary syphon pipes, open or enclosed gearing. All machinery manufacturers can supply them. We'll supply a pair for 90-day trial in your own mill, so you can get all the facts first hand.

Write for information on Johnson Joints—most advanced and most complete line of its kind.

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The Paper Industry

Technology • Engineering • Management • Production

VOLUME 42 **NUMBER 2** **MAY 1960**

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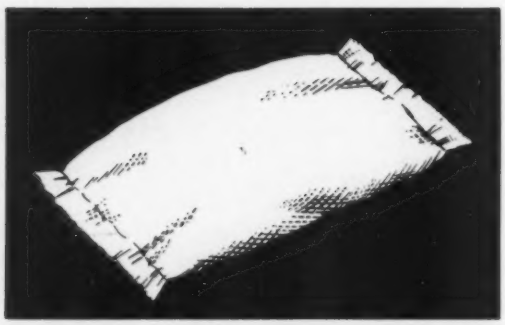

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From our point of view..

Better planning in the Sixties

The "sins of omission" — as a result of inadequate planning in business and industry — have never been more apparent as they are today with our entry into the widely heralded Golden Decade of the sixties.

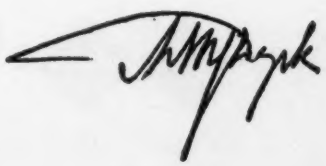
The need for better planning has become especially obvious in the wake of some rather general expressions of disappointments to the effect that the Golden Sixties are not as golden as they were expected to be. The prevalence of this feeling of mild disappointment — despite the fact that the year 1960 is showing a record level of economic activity — is clear proof that intelligent and consistent planning have not yet become an inherent characteristic of a large segment of the American Business World.

If we had planned better, we would have seen things more realistically; we would not have viewed the Sixties with "excessive expectations"; and we would not have succumbed to a feeling of disappointment following the realization that the advent of the sixties had failed to engulf us with a reverberating business boom. If we had planned better, we would have recognized the year, 1960, as a year of record business activity, even should the output of the paper industry fall short of topping the 1959-output by 2,000,000 tons.

We also need to plan better to improve the profit picture of the paper industry. This will not be accomplished as a result of a certain "magic quality" we attribute to the Golden Sixties or of some other combination of circumstances. This can only come as a result of (1) a better understanding of our markets combined with an ability to sell in these markets, (2) a high level of quality control, and (3) accelerated research and development with the view to increasing our productivity. An example of what can be accomplished with good planning and foresight is dramatically illustrated by the automatic stock and dye proportioning system installed at S. D. Warren's Central Mill described in this issue.

We need better planning and a keener pioneering spirit to capture a greater share of the overseas markets for our industry. Even with the stronger upward pattern shown by U. S. exports of the pulp and paper industry products in the recent years, there is no reason why this industry should not advance to the point of becoming one of the principal exporters to overseas markets.

The possibilities are unlimited in every direction. It only takes intelligent planning, hard work and bold action to bring them within reach.



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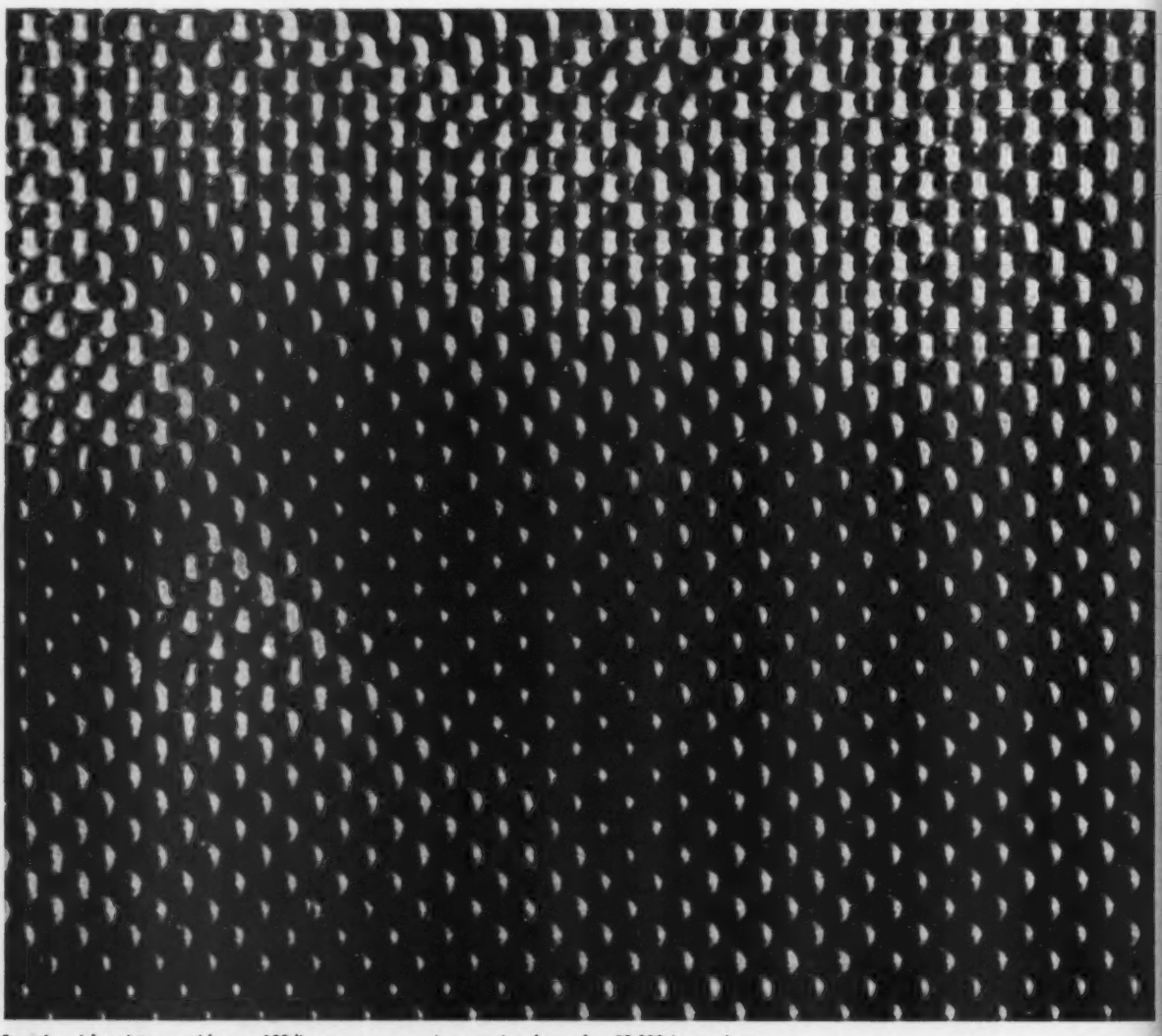

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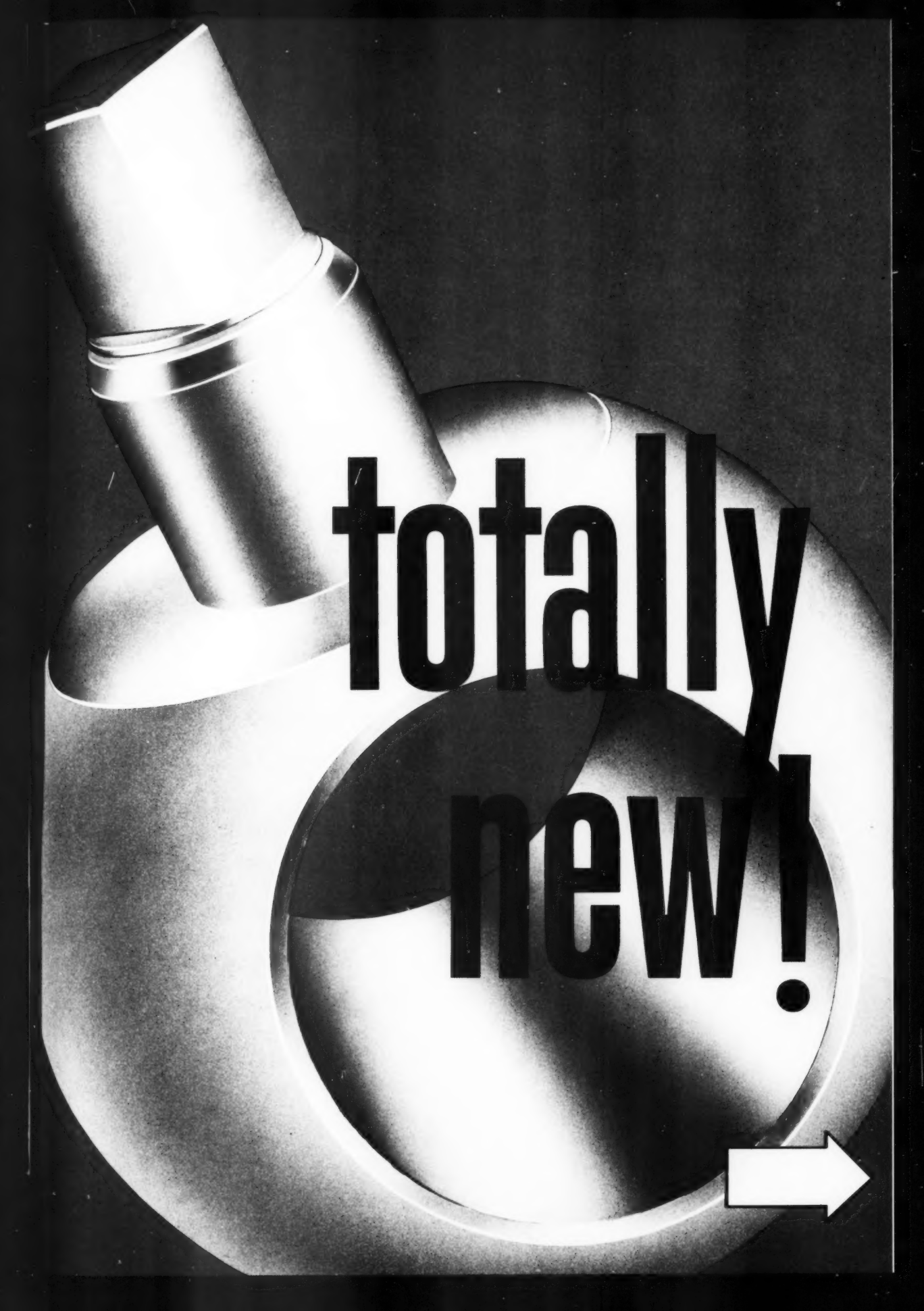
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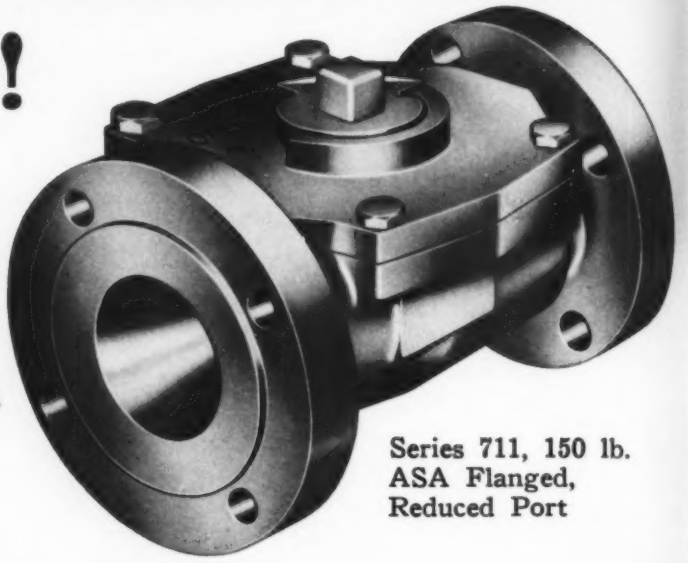

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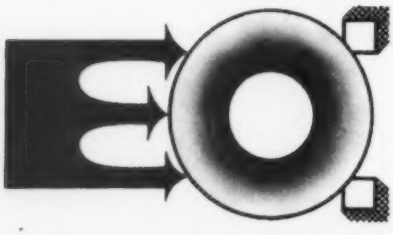

Floating ball puts excessive pressure load on fixed seats. Results in distortion and short life.

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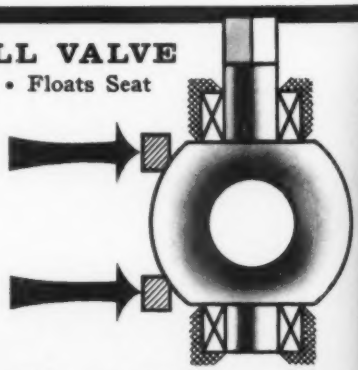
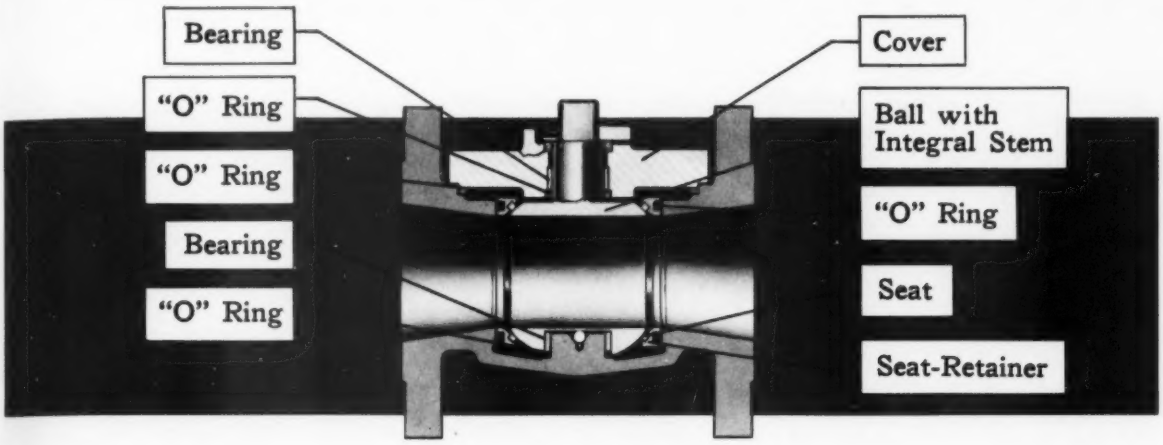


FLO·BALL bearings absorb all pressure forces. Elimination of excessive seat loading insures long life.

The Series 711 ***FLO·BALL*** valves are available for off-the-shelf delivery. Manufactured to standard ASA dimensions in carbon steel, 316 stainless steel, and aluminum for body and ball, Teflon for seats, and Buna "N" O-Ring seals. Other materials are also available. These valves operate at pressures to 300 psi, temperatures to 400° F.



The Hydromatics Series 711 FLO•BALL valve gives you the features you must have!

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an imagination of iron, brass, copper and lead,
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inanimate.

but it spoke—
a different kind of language,
of pounds and ounces and fractions thereof
and it spoke only the truth.

it felt—
the roundness of grain, the smoothness of marble,
the sweetness of candy and the authority of gold.

it heard—
the sound of life, babies newborn
it cradled them and recorded their growth
until pounds and ounces were replaced
by years and months.

it traveled—
by packet boat down the Mississippi,
by clipper ship to England,
The Sandwich Isles, the Indies,
South America and China.
better known throughout the world
than anything else made in America.

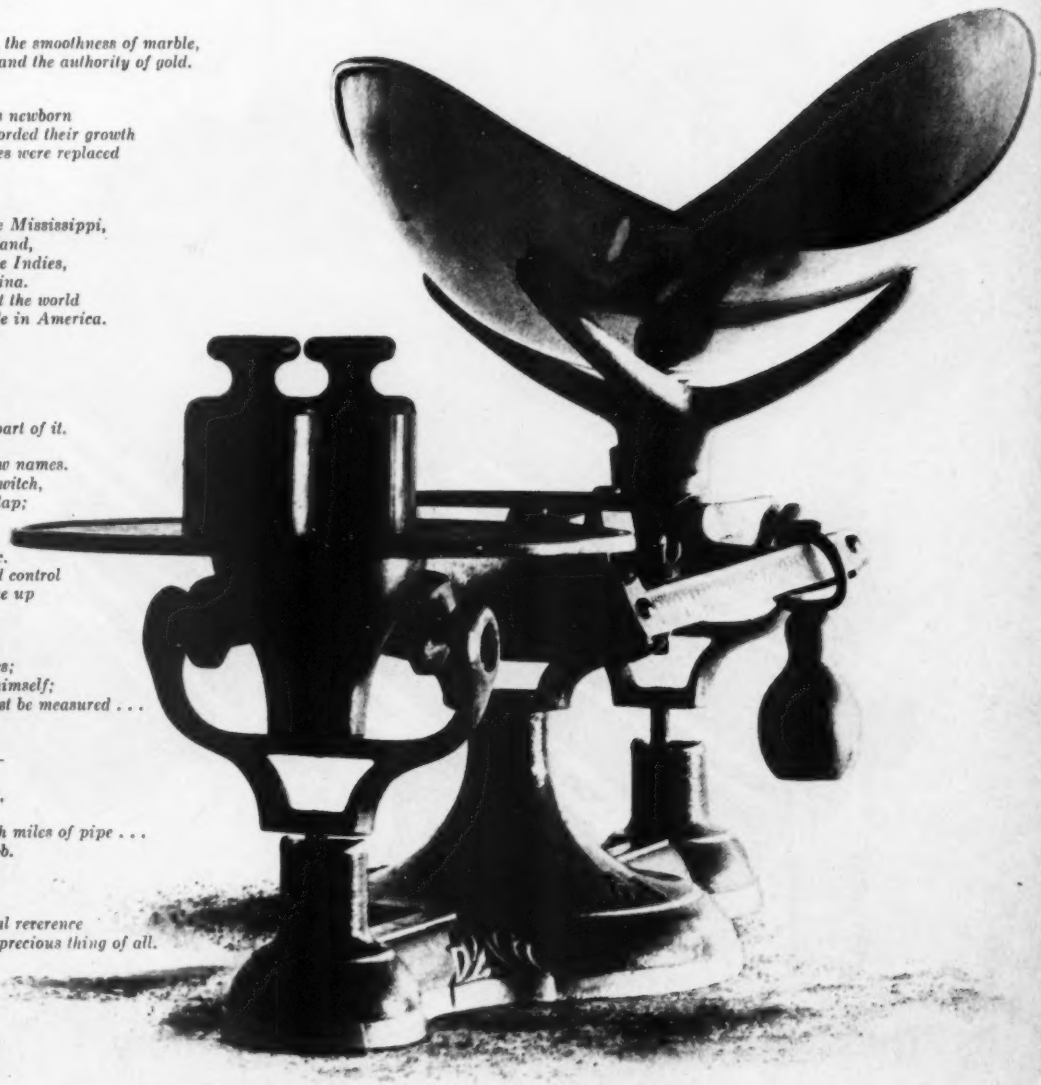
it was relied on
by farmers, merchants,
scientists and doctors.
it witnessed history;
influenced it and was part of it.

its descendants have new names.
floaxial dial, mercoid switch,
reed switch and cotton lap;
remote control,
printomatic,
electronic and levetronic.
all serve to evaluate and control
the substances that make up
the universe.

raw materials
or manufactured articles;
things unseen or man himself;
all have weight and must be measured . . .
our scales do the job.

and the new challenge—
weight in motion . . .
freight trains in transit,
trucks too busy to stop,
liquids coursing through miles of pipe . . .
our scales will do the job.

but this was our first—
Fairbanks No. 1
and we hold it in special reverence
for it weighed the most precious thing of all.
it weighed an idea.



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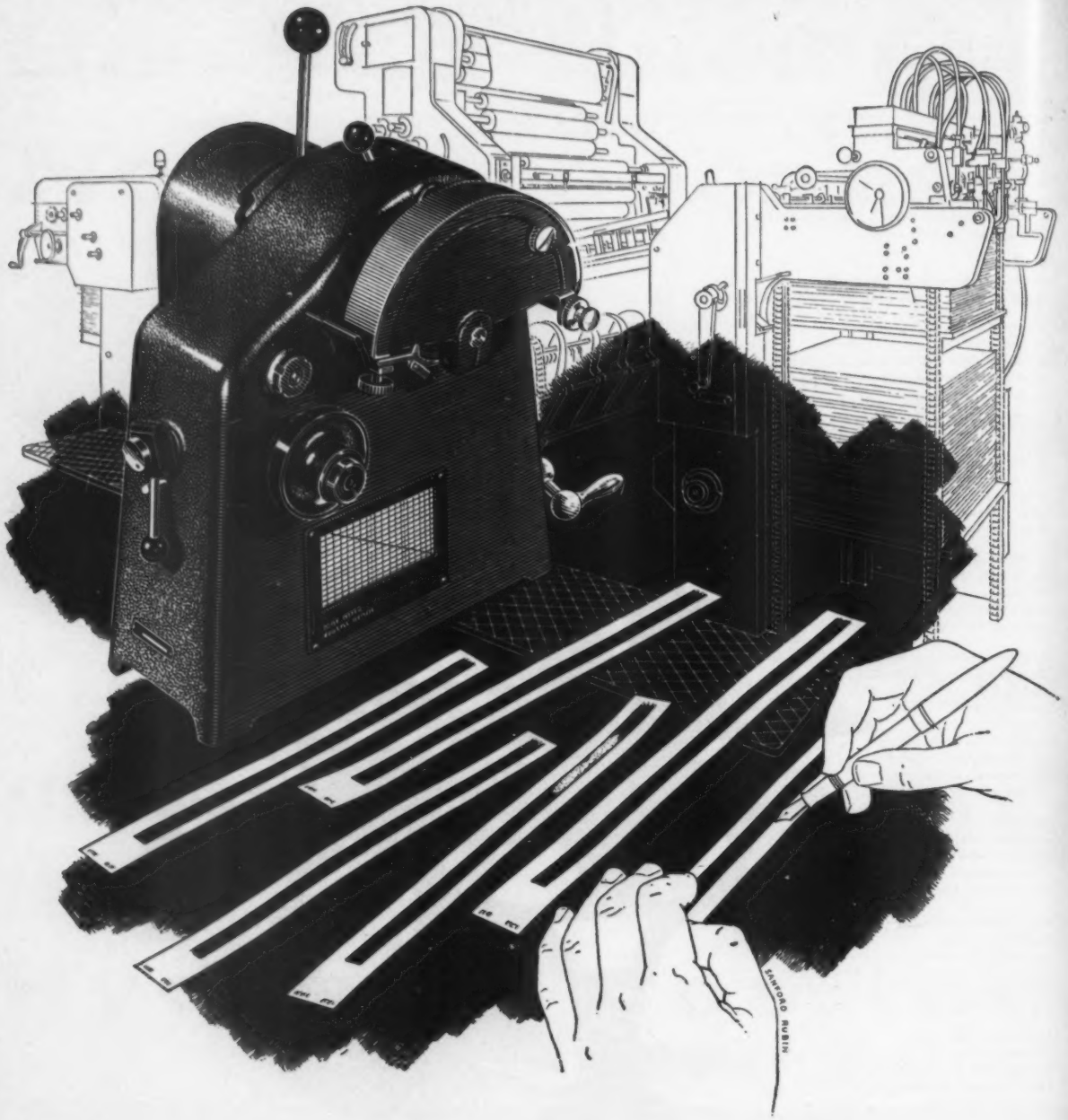

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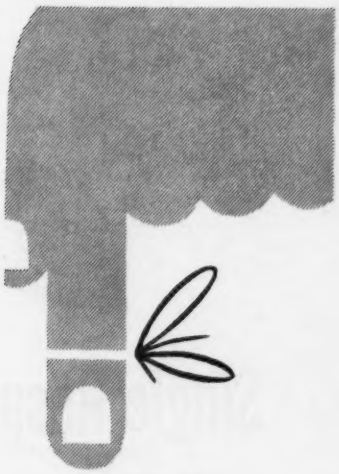

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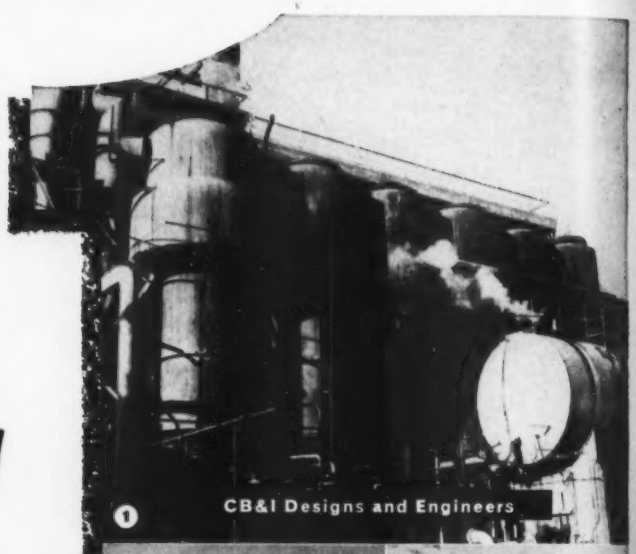

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1 Stainless steel Hortonclad® sextuple effect evaporator for foaming black sulfate liquor.

2 13-ft. diameter by 63-ft. digester leaves CB&I stress relieving furnace.

3 CB&I-patented girth welder insures strong, uniform welds.

4 Seven 17-ft. diameter sulfite digesters and four 17-ft. accumulators were erected, welded, stress relieved and X-rayed by CB&I at this site.

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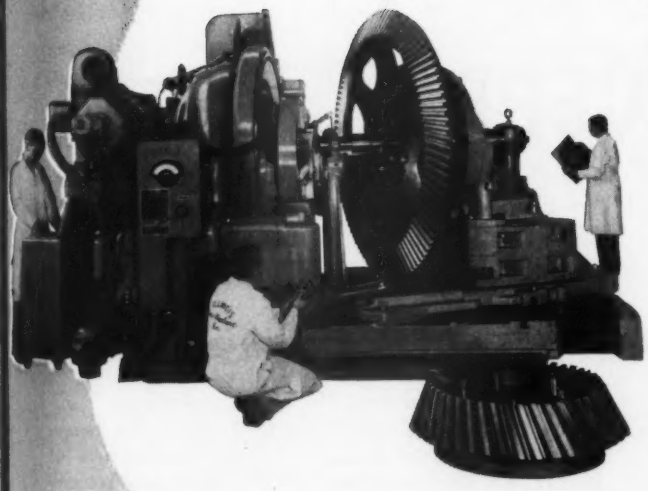

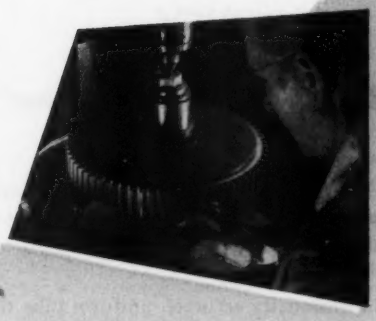

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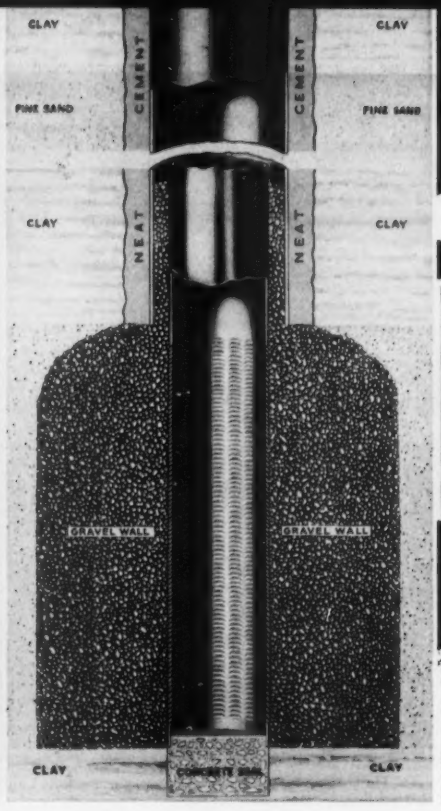
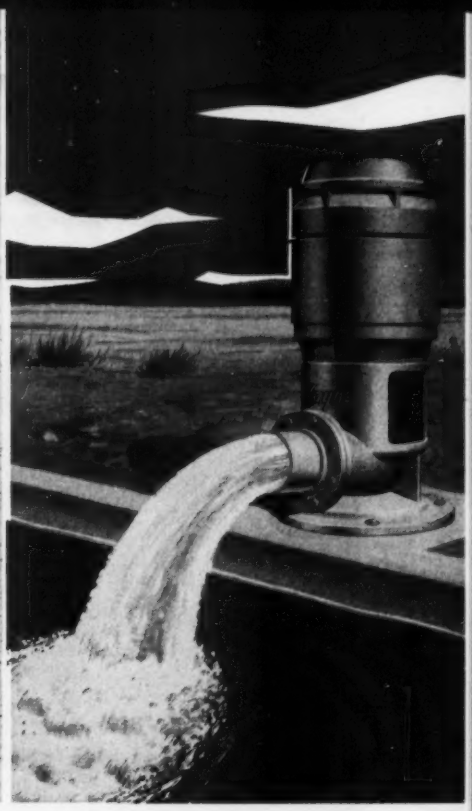




WATER WATER WATER

With A Layne Drilled Well Layne knows where the water-bearing formations are located. They have been drilling wells for over 75 years. This experience comes from searching and researching water aquifers. Knowing *where* to drill is half of the success—knowing *how* is the other half. In drilling a straight well experience counts—and you can count on Layne. Layne specializes in water well drilling. To get a good start for a water supply—you need a good well. You get a good, producing well when you specify a Layne drilled well. *Bulletin No. 100*

With A Layne Gravel Wall Well This technique and resulting arrangement of the new 134 Shutter Screen and gravel (shown here) permits the free flow of water into the well and affords the following advantages: larger shutter screen openings, reduced friction, reduced draw down and pumping head—thereby reducing pumping costs, increased specific capacity and more effective retention of native sands. Cemented wells are installed if indicated, and result in greater purity of supply as well as increased life of the well. *Bulletin No. 900*

With A Layne Vertical Turbine Pump Whatever the pumping requirement, there's a Layne pump to meet any pumping conditions. Layne Vertical Turbine Pumps come in a wide range of sizes and capacities, delivering 30 to 20,000 GPM and requiring from 4 to 42 inch well casings. The complete line of Layne Pumps include: Deep Well Vertical Turbine (oil or water lubricated), Short Coupled Vertical Turbine, Propeller, Mixed Flow, Fire Pumps and Volatile Liquids Pumps, Regular and "In-Line" Submersible. *Bulletins No. 200 (oil) 201 (water)*

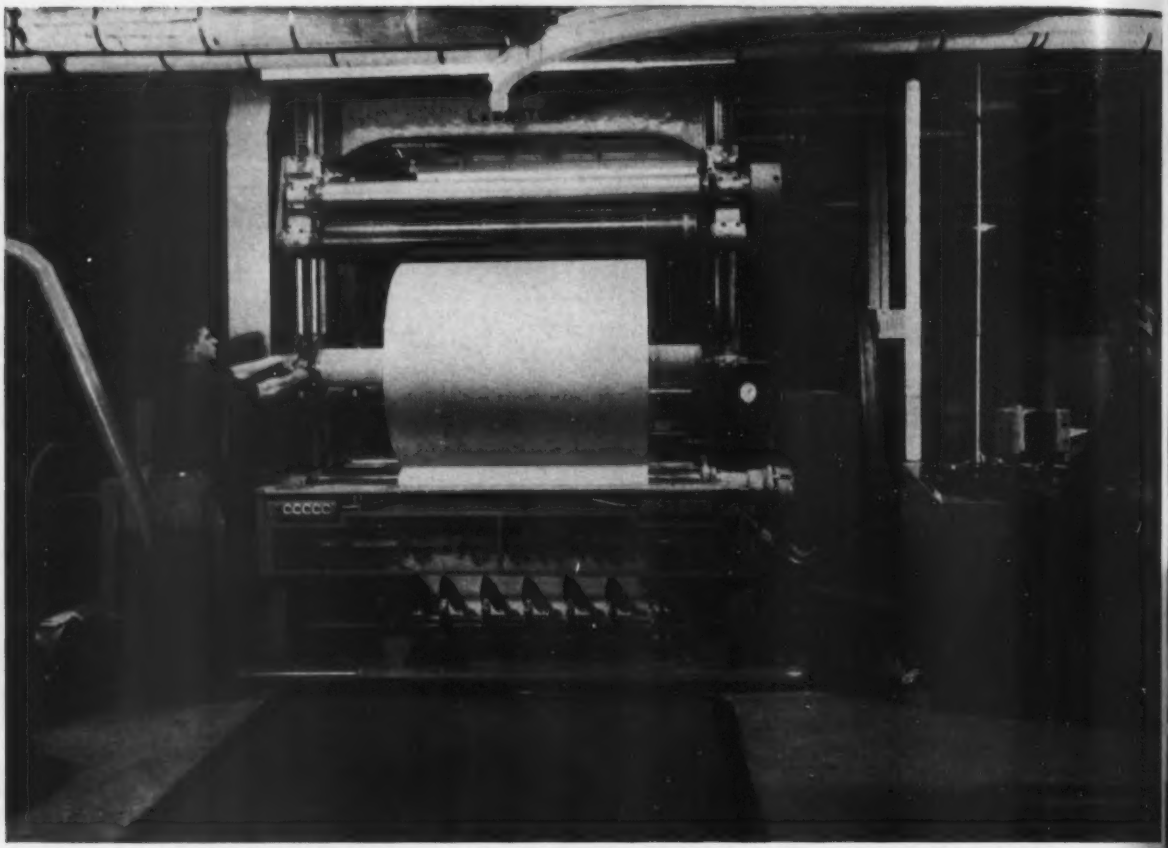
LAYNE OFFERS COMPLETE WATER SERVICE: Initial surveys • explorations • recommendations • site selection foundation and soil-sampling • well drilling • well casing and screen • pump design, manufacture and installation construction of water systems • maintenance and service • chemical treatment of water wells • water treatment—all backed by Layne Research. Layne services do not replace, but coordinate with the services of consulting, plant and city engineers.

Layne SINCE 1862

WORLD'S LARGEST WATER DEVELOPERS

LAYNE ASSOCIATE COMPANIES THROUGHOUT THE WORLD

Sales Representatives in Major Cities



New 72-inch Type CA Langston Slitter and Winder in Marathon Corporation finishing room handles rolls up to 60 in. in diameter at speeds up to 1500 ft. per minute. Finished rolls are lowered by hydraulic drop shown in foreground.

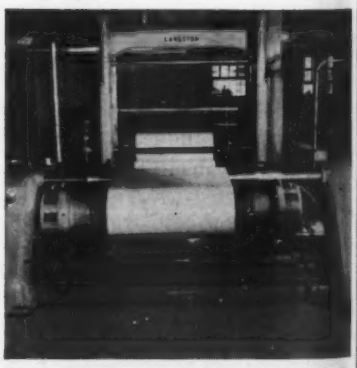
New Langston Slitter and Winder helps Marathon cut operating costs

This new Langston Slitter and Winder installation at Marathon Corporation's Rothschild, Wis., mill is already helping the company cut costs and speed processing of quality paper and board.

For example, the power-operated shaftless unwind stand virtually loads itself. No crew is needed to bull heavy shafts into place. And the Langston hydraulic roll ejector permits 1-man removal of finished rolls. These two features alone are saving Marathon several thousand dollars a year. Water-cooled Wichita-type air brakes can be operated from control console.

Besides effecting major operating economies, these Langston machines also pay off in higher quality rolls. The hydraulic rider roll control, for instance, automatically keeps nip pressure constant, regardless of the diameter or weight of the rewound roll. This insures rolls of uniform density with reduced tendency toward wrinkling or telescoping. The shear-cut slitters cut like scissors instead of a knife, shearing cleanly and keeping paper dust to a minimum. The resulting clean-edged, dustfree rolls are easier for customers to process.

Learn how you can benefit from the advantages of Langston Slitters & Winders. Write SAMUEL M. LANGSTON Co., 6th & Jefferson Sts., Camden 4, N.J.



Langston Shaftless Unwind Stand eliminates the time-consuming, back-breaking task of hoisting heavy shafts into place. The hydraulically actuated arms reach out, pick up the roll and lift it to running position—a 1-man, push-button operation.

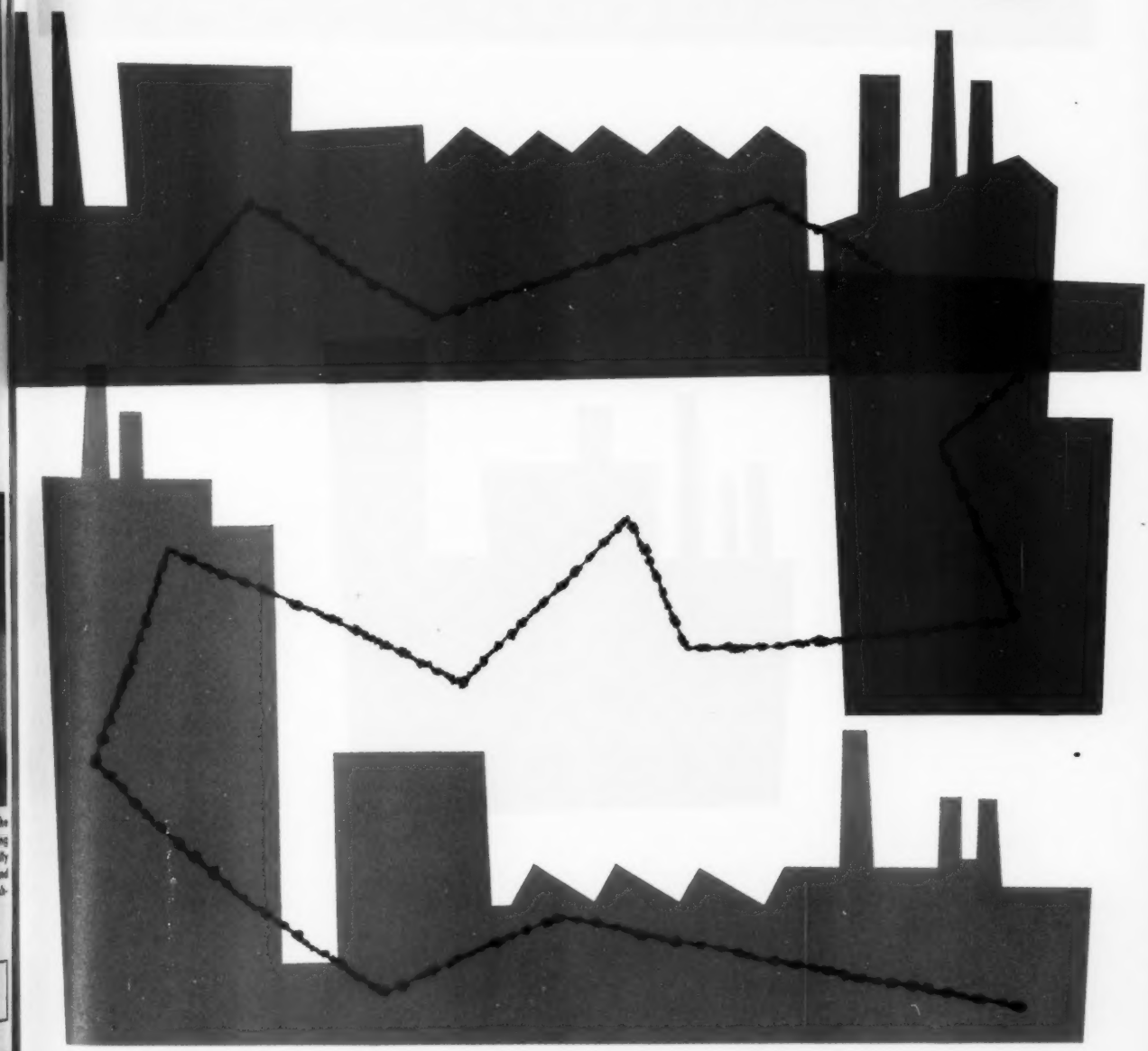
LANGSTON

Leadership...by design

For more data circle 116 on Post Card

LET YOUR APPLETON MAN TAKE A FRESH LOOK AT YOUR FELT APPLICATION AND PERFORMANCE PROBLEMS. It can be a rewarding experience—it has been for others. By working with our laboratory research men, felt designers and experienced production people, he can bring you a custom designed application to improve felt performance and life. What better way to increase production and cut costs (has a nice effect on profits, too). Ask him to take a look-see soon! You'll be glad you did!

AP-PLY FELTS
Appleton Woolen Mills
Working With The Paper Industry
Appleton, Wisconsin



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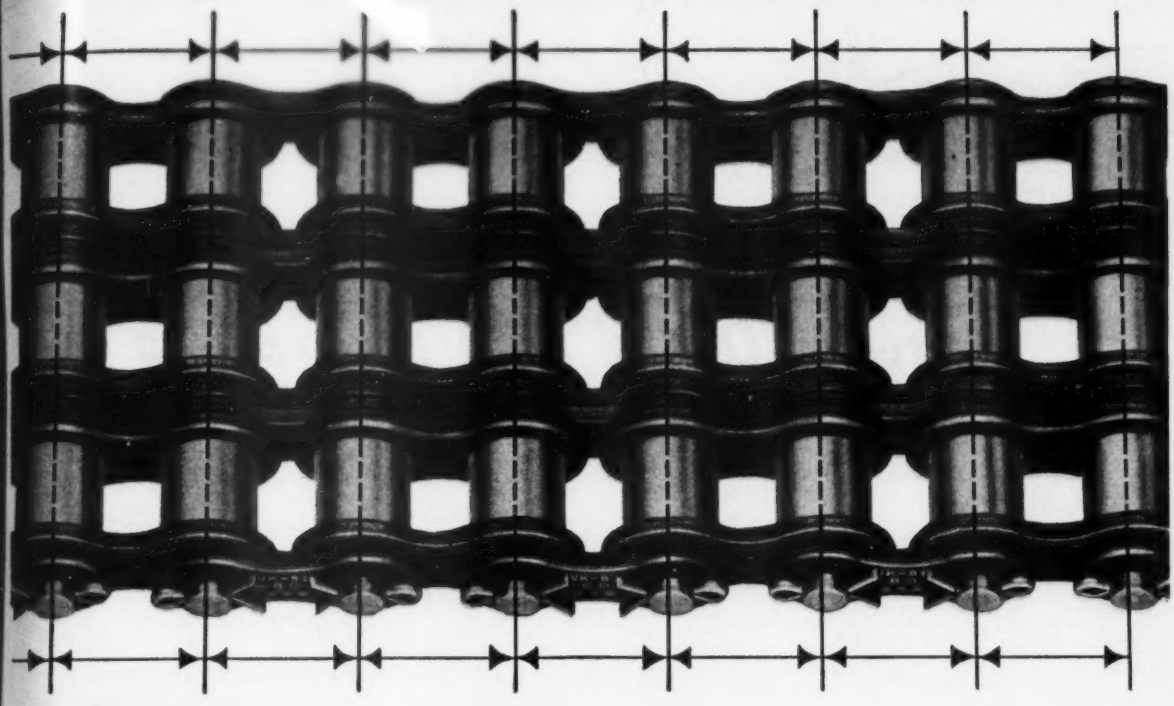
For more data circle 118 on Post Card



Equal length... equal strength

How pre-stressing ensures uniform load distribution of multiple-width LINK-BELT roller chain

Pre-stressing is one of the reasons why Link-Belt multiple-width precision steel roller chains easily handle the grueling loads common on today's drives. It seats and cold works the chain joint parts, assuring equal load distribution across the chain, minimum initial elongation, increased fatigue life.

Pre-stressing is just one of many "extras" that contribute to the *greater dynamic strength* of Link-Belt roller chain. Others include: close heat-treat control, lock-type bushings, shot-peened rollers, pitch-hole preparation. For details see Book 2657.

PRE-STRESSING MACHINE provides the pull that "sets" the parts of Link-Belt multiple-width roller chain. Besides assuring uniform load distribution, pre-stressing eliminates application difficulties on fixed center drives because the chain leaves the factory at precise operational length.

LINK-BELT

ROLLER CHAINS AND SPROCKETS

BOOK 2657 has 154 pages of roller chain data. Contact your nearest Link-Belt office or authorized stock-carrying distributor. (See CHAINS in the yellow pages of your phone book.)

15,077

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For more data circle 119 on Post Card

S. D. Warren's (Central Mill) new refining and stock-proportioning system

A. W. J. DYCK

▶ The Foxboro Co.'s completely automatic pre-refining and stock proportioning system, installed at S. D. Warren's Central Mill, handles pine, hardwood and purchased pulps and blends these, together with dyes and broke, in whatever proportion desired.

S. D. WARREN COMPANY'S Muskegon, Mich., mill is the first to put magnetic flow meters in operation on all pulp, additive and dye flows for completely automatic stock proportioning. This mill is also the first in the industry to remove all its old beaters in favor of automatic stock proportioning on all four paper machines. The new blending systems, which are the most modern in operation have been operating since early February, 1960. The previous batch beater systems did not provide accurate furnish blending, nor did they provide separate beating of the pine and hardwood pulps.

The Central Mill makes high-grade, coated and uncoated book papers on four paper machines. On-machine coating is done on Warren impregnation coaters which features synchronized drives on the top and bottom rolls and a coating applicator roll.

A preliminary step to the installation of the stock proportioning system was the four-stage bleach plant installed three years ago and providing the company with bleached stock of 78-80 G.E. brightness. The bleach system consists of chlorination, caustic extraction, hypochlorite and peroxide stages. A novel modification of the peroxide stage is the addition of H_2O_2 (0.2 per cent on the pulp) and a polyphosphate mixture to the fiber cake off the third washer, enabling the bleaching to continue in the high-density, bleached storage chests.

The new stock refining and stock proportioning systems operate on a continuous basis. The refining system is designed to give separate refining treatment to pine, hardwood and purchased pulps—so that the pulps are brought to the required level of development before they are blended and given the final refining treatment.

Stock pre-refining

Bleached hardwood (consisting largely of poplar) and pine are pumped from the high-density, tile-lined storage tanks, of 110-ton capacity at 12 per cent consistency each, to two 90 ton/day capacity Claflin refiners, each driven by a 350 hp synchronous motor equipped with Safuse controls of the air-break type using top-mounted fuse cutouts. The refiners, equipped with Bidwell linings, have a low power consumption of 4 hp-days per ton of refined pulp and can be used either in series, parallel, or one at a time. All stock flow to the pre-refining operation is controlled by a magnetic flow meter.

Purchased pine pulp is repulped in a Hydrapulper, dropped to a low-density storage chest, refined in a No. 2 Miami jordan of 50 ton/day capacity and pumped on low density-storage.

Following refining in the Claflins, stock is thickened in an 8-ft. by 16-ft. thickener of 240 tons/day capacity and dumped directly into either the hardwood or pine bleached-refined, high-density storage tanks. These tanks, each 30-ft. dia. by 53-ft. high, are of steel construction and tile lined.

The complete pre-refining operation is controlled from the thickener panel which houses (1) a white water seal tank level control instrument, (2) thickener level control, and (3) two Claflin refiner watt meters.

An interesting feature of the control system is the temperature difference recorder which measures the temperature difference of the stock before and after refining. This provides a fairly accurate measure of the amount of work done on the stock and is especially valuable when the Claflins are operated in parallel and the same level of refining is required of each refiner.

Bleach and stock pre-refining are so highly instrumented that two men per shift are in complete control of these operations.

Frank W. Roberts
Mill Manager

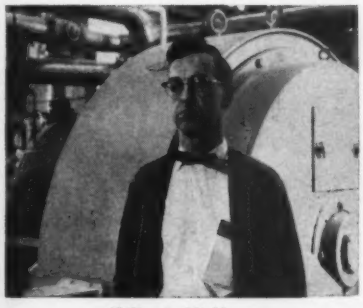
William H. Marra
Technical Service Manager

E. Lawrence Pennell
Production Superintendent

Charles S. Russel
Production Superintendent

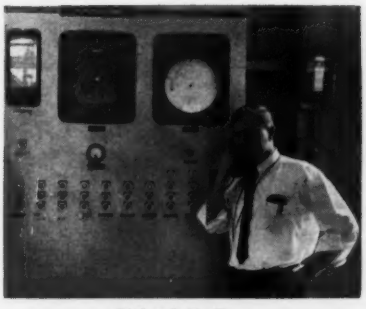
William A. Wrase
Chief Engineer

Hugo J. Hotz, Sr.
Technical Director

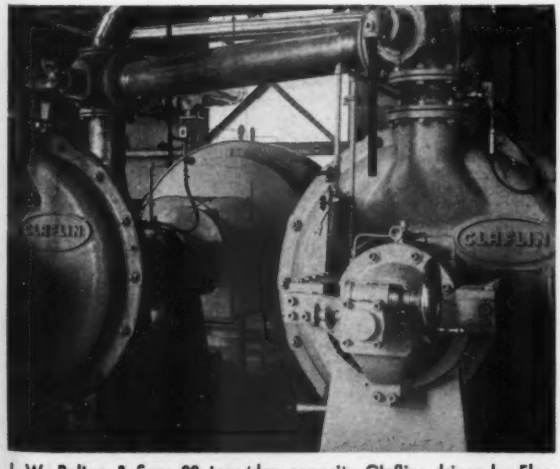


Philip J. Hinkley
Pulp Mill Superintendent

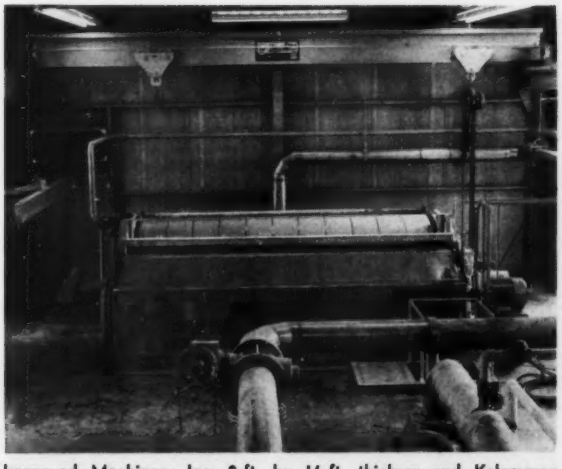
Robert H. McBride
Paper Machine Superintendent



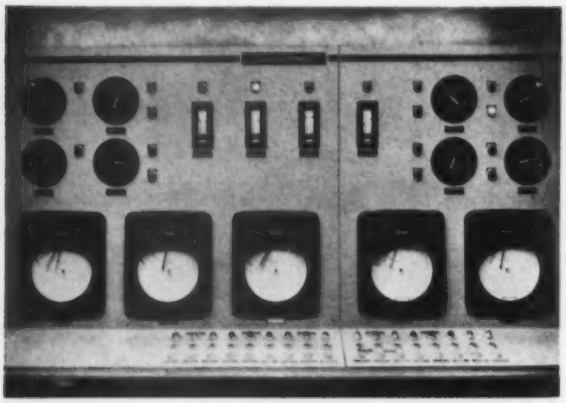
Richard G. Tarr
Assistant Technical Service Manager



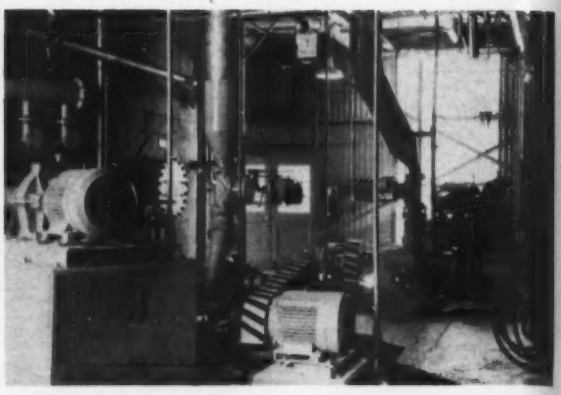
J. W. Bolton & Sons 90 tons/day capacity Claflins driven by Electric Machinery 350-hp. motors.



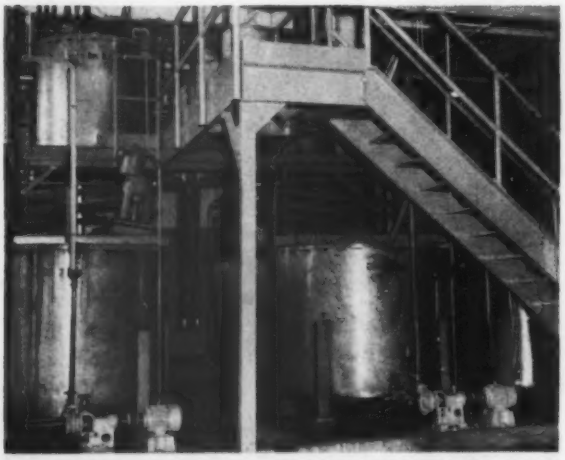
Improved Machinery Inc. 8-ft. by 16-ft. thickner and Kalamazoo Tank & Silo Co. thickner vat of tile construction.



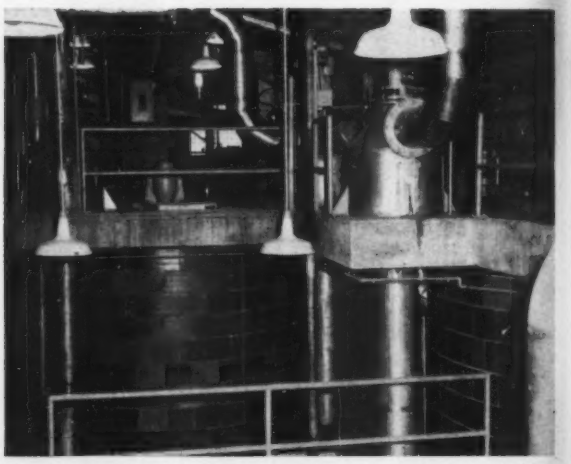
Foxboro central panel from which stock flow to the surge tanks is controlled. Among other controls are header-pressure controls, chest-level indicators, etc.



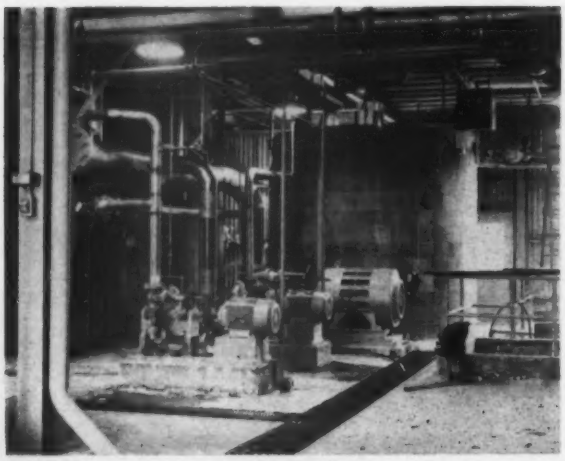
Gould pumps pump stock from high-density storage to surge tanks. Also shown are drives and Impco agitators on D. H. storage tanks.



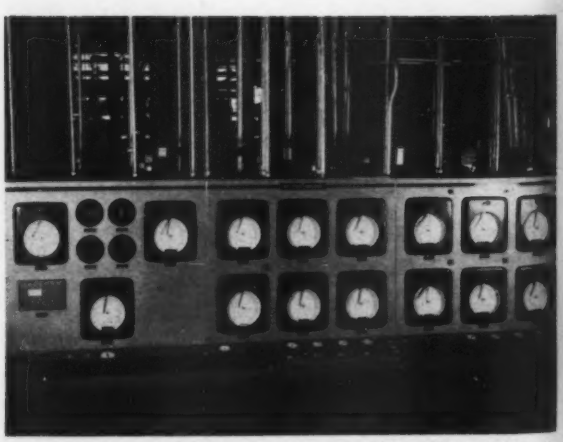
Muskegon Boiler Works stainless steel dye mixing and storage tanks equipped with mixing equipment agitators. Dye solutions are pumped by Gould stainless steel pumps.



Kalamazoo Tank & Silo Co. surge tanks of tile construction holding 4 ½% consistency pine and hardwood stocks. Also shown is a De-Zurik consistency regulator.

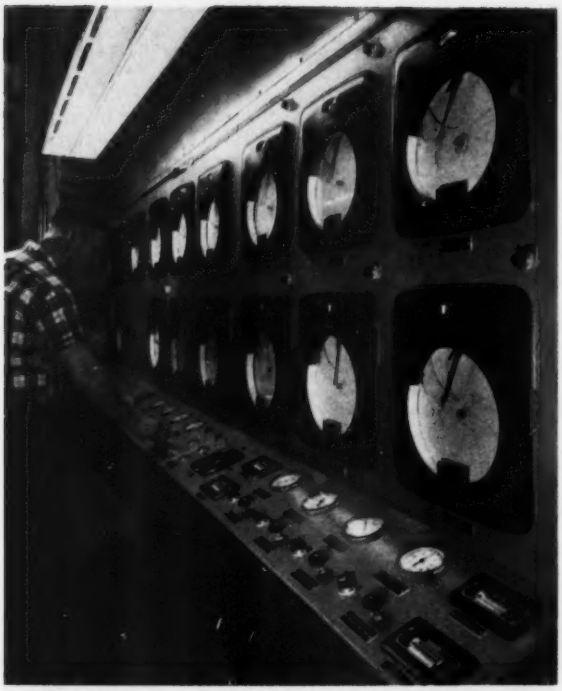


Seal tanks for refined stock thickner and low- and high-pressure dilution pumps.

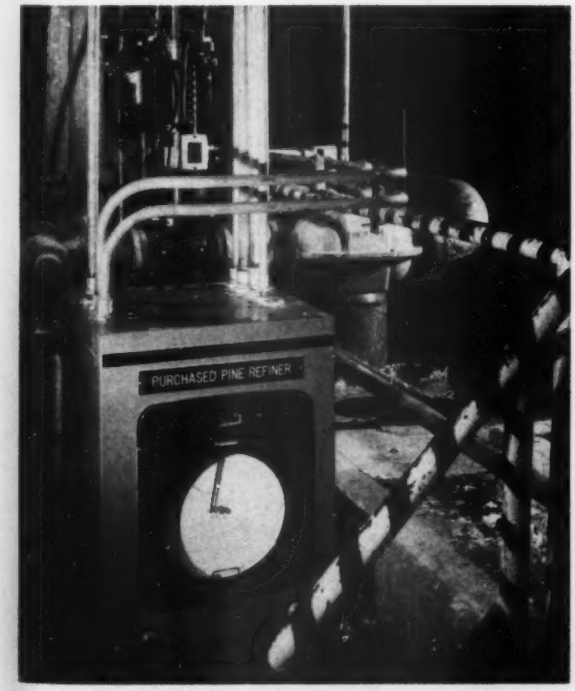


Foxboro No. 1 paper machine control panel from which all bleaching operations are controlled.

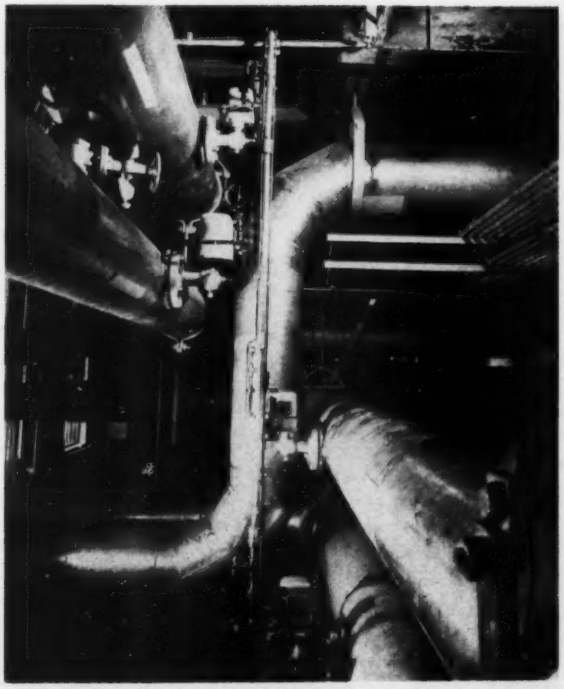
Close-up view of portion of No. 1 machine panel shows pH controller at left and total stock flow recorder at top center.



Details of Foxboro control panel for No. 1 machine. Four stock, four dyes and three additives are proportioned automatically from this panel.



Flow of purchase pine stock from the refiner to the stock chest is controlled from this station. At right is Foxboro magnetic flow meter; in background, 4-in. Saunders control valve.



Close-up view of stock pipe system with Grinnell Co. Saunders control valves located at strategic places.

Principal Equipment Installed at S. D. Warren Company Central Mill

Stock treatment

Agitators	Improved Machinery Inc.
Consistency regulators	DeZurik Corp.
Control panels	Foxboro Co.
Controls, on motors	Allen Bradley Co.
Conveyors	W. A. Melchior
Dilution equipment, for high density storage tanks	Improved Machinery Inc.
Heating and ventilation equipment	Young Radiator Co.
High density storage tanks, steel work	Grover Tank Co.
Instrumentation	Foxboro Co.
Motors, on pumps	Reliance Electric & Engineering Co.
Motors (2), 350 hp synchronous, on Claflin refiners	Electric Machinery Mfg. Co.
Pumps (7), for pumping 4½% to 5% stock, 440 gpm to 1100 gpm capacity	Goulds Pump Co.
Refiners (2), Emerson Claflin, 90 tons per day capacity, equipped with Bidwell linings	J. W. Bolton & Sons
Thickner, 8 ft., x 16 ft., 240 tons per day capacity	Improved Machinery Inc.
Thickner vat, tile construction	Kalamazoo Tank & Silo Co.
Tile linings, on high density storage tanks	Kalamazoo Tank & Silo Co.
Valves, on stock	Fabri Valve
Valves, Control	Grinnell Co.

Stock proportioning

Agitators, on stock surge chests	Improved Machinery Inc.
Chests, (3), stock surge, 2 4-ton capacity and 1 3-ton capacity of 4½% consistency stock, tile construction	Kalamazoo Tank & Silo Co.
Consistency regulators	DeZurik Corp.
Control panels	Foxboro Co.
Controls, on motors	Allen Bradley Co.
Instrumentation	Foxboro Co.
Magnetic flow meters	Foxboro Co.
Motors, electric	Reliance Electric & Engineering Co.
Pumps (4), on white water 120 gpm to 4,000 gpm capacities	Goulds Pump Co.
Pumps (12), dye solution pumps, stainless steel construction	Goulds Pump Co.
Tanks (13), dye mixing and dye storage tanks, stainless steel construction	Muskegon Boiler Works
Tank agitators, on dye mixing and dye storage tanks	Mixing Equipment Co.
White water tank and combination seal tank, 10,000 gallons capacity	Stebbins Engineering Co.
Jordan, No. 2 of Miami, 50 tons per day capacity	Black-Clawson Co.

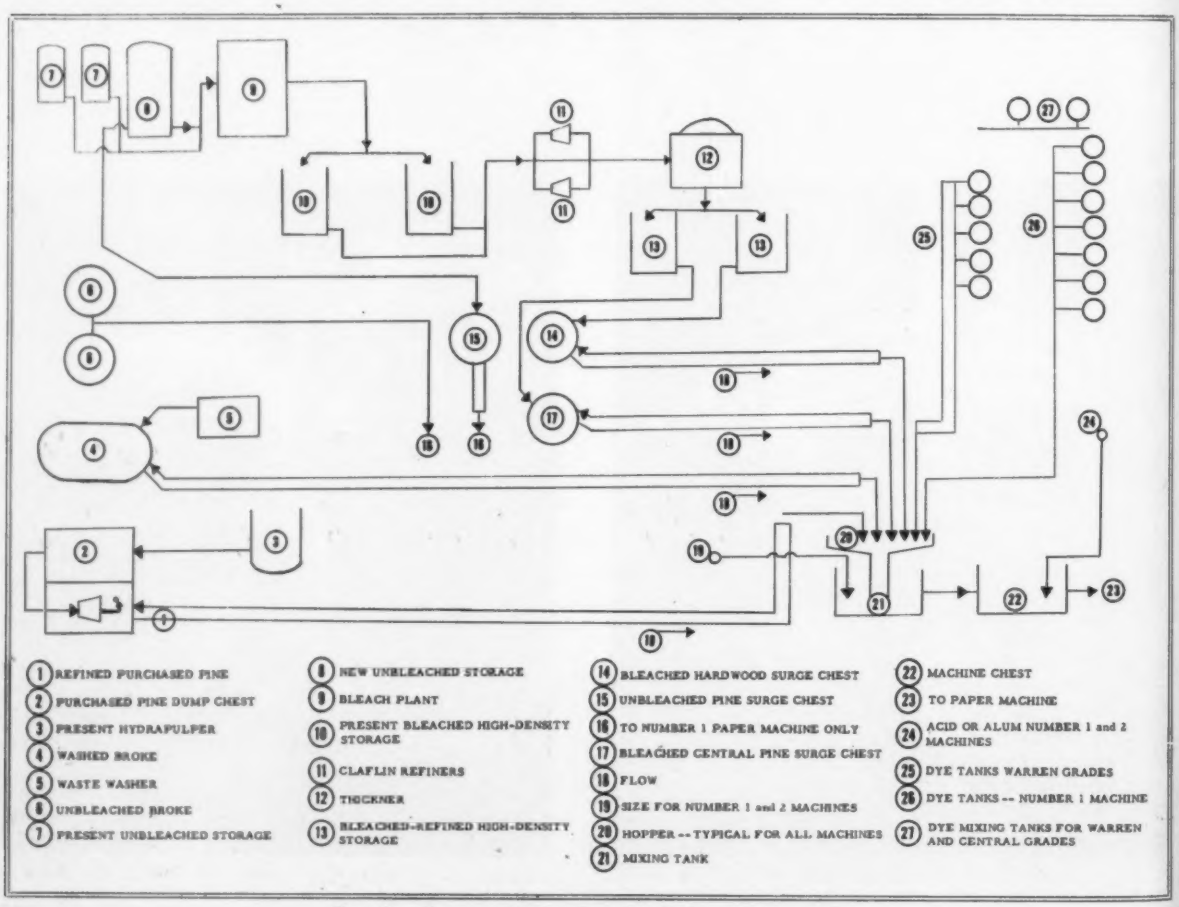
Major Construction Contractors

Engineering & General Contractors	Sumner Sollitt Co.
Electric, Installation	Hall Electric Co.
Instrumentation	Century Piping Co.
Insulation	M. S. Knee Co.
Piping	Rowland Tompkins & Co.
Sheet Metal Work	Livingston Sheet Metal Co.
Structural Steel	Steel Fabricating Co.

White water system

The white water system is designed to make maximum use of the white water for stock dilution and stock refining. While formerly each paper machine had its own individual save-all, the white water from all three machines is combined in one of the compartments of a 10,000 gal. combination seal tank. The other compartment

(Continued on page 110)


1 REFINED PURCHASED PINE
2 PURCHASED PINE DUMP CHEST
3 PRESENT HYDRAPULPER
4 WASHED BROKE
5 WASTE WASHER
6 UNBLEACHED BROKE
7 PRESENT UNBLEACHED STORAGE
8 NEW UNBLEACHED STORAGE
9 BLEACH PLANT
10 PRESENT BLEACHED HIGH-DENSITY STORAGE
11 CLAFLIN REFINERS
12 THICKNER
13 BLEACHED-REFINED HIGH-DENSITY STORAGE
14 BLEACHED HARDWOOD SURGE CHEST
15 UNBLEACHED PINE SURGE CHEST
16 TO NUMBER 1 PAPER MACHINE ONLY
17 BLEACHED CENTRAL PINE SURGE CHEST
18 FLOW
19 SIZE FOR NUMBER 1 and 2 MACHINES
20 HOPPER -- TYPICAL FOR ALL MACHINES
21 MIXING TANK
22 MACHINE CHEST
23 TO PAPER MACHINE
24 ACID OR ALUM NUMBER 1 and 2 MACHINES
25 DYE TANKS WARREN GRADES
26 DYE TANKS -- NUMBER 1 MACHINE
27 DYE MIXING TANKS FOR WARREN AND CENTRAL GRADES

Flow chart for new refiner and stock and dye metering system.

Lubricants and Lubrication in the pulp and paper industry

Part I – Paper mill lubricants

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Socony Mobil Oil Co. Inc.

THAT LUBRICATION is a necessary and important factor in the production of paper is well recognized by all mill superintendents. Yet, when he looks at the $6,000 to $10,000 bill for lubricants it seems like a lot of money. And, of course, it is. But when considered in relation to other costs, on the magnitude of which it exerts an important influence, the size of the bill will look quite different. For example, the average maintenance cost of four mills having gross yearly sales of about $10,000,000 are—

Maintenance labor and material	$650,000
Cost of lubricants	9,500
Cost of lubrication labor	26,500

Machine maintenance averaged over 50 per cent of the total. This included wire costs in the neighborhood of $25,000 and felt costs of about $50,000. Other costs not included are about $70,000 for downtime due to all causes and $90,000 a year for broke. Lubrication can affect all these costs. It is also of interest to note that the cost of labor for applying lubricants is about three times the cost of the lubricants. Obviously, then it is being unwise to buy lower-cost, lower-quality lubricants when their cost is so small compared with the magnitude of the maintenance and operating costs they affect. Rather, the most effective lubricant for the job should be purchased without regard to its cost providing the supplier also gives service that will help reduce the larger costs of application, maintenance and downtime.

Selection of lubricants

Oil and grease are actually tools that the oilerman uses to protect machines. As all journeymen know, to get the best results requires the use of the right tool for a given job. So also the oilerman must apply the correct lubricant to each machine. If there are a great many lubricants in the oil house, it becomes all too easy for the oilerman to use the wrong lubricant. Consequently it is most important to keep the number of different lubricants to a minimum. This not only minimizes the opportunity for mistakes, but also reduces the inventory of lubricants that have to be stored, and therefore releases space (worth $4.00 per square foot per year) for other purposes. In addition, the purchasing agent can buy larger quantities of some products and so obtain price advantages that result from bulk or large quantity deliveries.

The characteristics that a lubricant must have are dictated by the machine in which it is to be used, the methods of application and the conditions under which the machine operates. This discussion must, of necessity, be general and can consider only the most important equipment. Lubricants for a particular mill can be recommended only after personal inspection by a qualified lubrication engineer, as no two will have identical equipment or conditions.

Heavy-bodied circulating oils

In this classification are oils that range in viscosity from 600 to 1800 SSU at 100°F. Their use is indicated where the oil is continually reused for long periods and where temperatures are high, or speeds are low to normal. To meet the requirements of the high temperatures at which modern dryer sections operate, special oils have been developed. These oils resist oxidation and the formation of deposits during years of service in the large dryer-roll bearing circulation systems. To obtain this long life under the high-temperature conditions, high-quality base stocks are fortified with oxidation inhibitors that are especially effective at high temperatures. Oxidation inhibitors effective at normal temperatures are not necessarily effective at higher temperatures.

Because of the inevitable contamination of these oils with water, protection against rusting is provided. Moreover, these oils have high initial demulsibility and remain free from any tendency to form heavy emulsions. This characteristic permits removal of water contamination by settling in the oil tanks used on these systems.

As a further precaution against the formation of deposits, circulating oils for high-temperature service often contain dispersant additives that hold fine carbonaceous material in suspension, so it can be removed by filters before forming deposits. In general, additives used for this purpose have an adverse effect on the demulsibility character of an oil. Unless the supplier has exercised great care in the type and quantity of dispersant additive used, very serious trouble will be experienced if any considerable quantity of water gets into the system.

There are available heavy-bodied circulation oils suitable for use at more moderate high-temperatures. These oils contain oxidation and rust inhibitors, but do not generally contain dispersant additives. They are also characterized by their ability to separate readily from water. Some oils of this type also have improved anti-wear

properties which makes them more effective for the lubrication of gears. In addition to their use in dryer systems, they are used in many areas in the mill including moderately loaded gears, bearings on calenders and super-calenders, corrugators, refiners and screens, and bath- or circulation-oiled rolling-element bearings that operate at high temperatures. Of course, the oils suitable for very high-temperature service may also be used in these other services should it be desirable in order to reduce the number of different oils carried in stock.

Turbine and hydraulic oils

These include oils that range in viscosity from 150 to 300 SSU at 100°F. They are oxidation- and rust-inhibited oils and meet the requirement for long, extended service in turbine circulation systems and in hydraulic systems, where even small amounts of deposits cannot be tolerated. They are also characterized by their ability to separate readily from water. Some oils of this type are so stable chemically that they can be kept in service almost indefinitely provided they are kept free from contamination and operate at normal temperatures.

In addition to their use in steam turbines and hydraulic systems on paper machine press rolls, calenders and rewind elevators, the heavier-bodied oils in this classification are used in ring-oiled bearings of electric motors, pumps and other equipment throughout the mill. They are also used to lubricate one- and two-stage air compressors and the gears and bearings of vacuum pumps.

Gear oils

Some gear drives require gear oils that have materially greater load-carrying ability than the heavy-bodied oils previously described. These can be classified under three different types: (1) extreme-pressure lubricants, (2) heavy-duty gear oils and (3) steam-cylinder oils.

Extreme-pressure lubricants contain oil-soluble additive materials (usually sulfur, chlorine and sometimes phosphorous) that react with the metal of the gear teeth to form anti-weld compounds. They protect against scoring of the smooth tooth surfaces under very heavy loads. They must have high chemical stability to resist oxidation at the high temperatures under which they sometimes operate. This characteristic assures freedom from thickening and deposits in long-time service. They must resist foaming as a result of being vigorously splashed in the gear case by the revolving gears and usually are formulated to provide protection against rusting. The latter property is especially desirable in gear drives where the possibility of contamination with water is present.

Extreme-pressure lubricants are used where the drives include hypoid-type gears, such as paper-machine backdrives. The nature of the sliding contact and the high-load carried by these gears requires oil containing anti-weld material to assure freedom from scoring and long gear life.

Other heavily-loaded gear drives that employ spur, spiral bevel, helical, or worm gears do not require the highly active anti-weld material used in extreme-pressure lubricants, but do require oil having better load-carrying ability than the heavy-bodied oils first described. Heavy-duty gear oils that meet this requirement are fortified with film-strength additives that are better suited to the loads carried by this class of gears. They must have high resistance to oxidation even at relatively high temperatures in order to assure long service life, freedom from thickening and the formation of deposits. They should separate readily from water contamination and resist foaming in the gear case. They normally provide good protection against rusting.

Heavy-duty gear oils may be required for the drive gears of rewinders, paper-machine backdrives, wet-end drives, mixers, skip hoists, chest agitators, couch rolls, calenders, screens, reels and pumps.

Heavy-bodied steam-cylinder oil containing effective compounding is often required in mills for the lubrication of moderately loaded worm-type gears and for the lubrication of steam cylinders. The compounding imparts rich lubricating value that reduces the operating temperatures of worm-gear drives, and resists the washing effect of condensation in steam cylinders.

Open gears require an extremely heavy-bodied lubricant that will adhere strongly to the teeth and will not be thrown off by centrifugal force as the gears rotate. It often is required to resist the washing action of water, and must not become brittle and drop off the gear teeth when exposed to low temperatures. Products of this type are available that are diluted with a non-flammable solvent which evaporates after the lubricant is applied. A thin film of extremely heavy-bodied oil remains on the gear teeth. The lubricant, as received, is sufficiently fluid for application without heating. It can be sprayed on the teeth or applied by force-feed lubricators, drip-feed devices or by brush. Some products of this type contain anti-weld material which materially assists in protecting against wear.

The gear-trains of older paper machines are often open or semi-enclosed and can be effectively lubricated with this type lubricant. Other drives that may have open gears include cookers, pulp shredders, washer-deckers, flat screens, savealls, reels, slitters, trimmers, winders, rotary cutters, outdoor cranes, hoists and conveyors.

General purpose oils

There are many bearings in the paper mill where the lubricating oil is applied by wick-feed oilers, bottle oilers, drip-feed oilers or direct from an oil can. All of these methods of application supply such small amounts of oil that thick-fluid films that float the journal in the bearing are not continuously maintained. The microscopically-thin films that do exist must be capable of protecting the bearing from scoring and excessive wear. To accomplish this, oils for this type of service are fortified with special anti-wear agents that create films difficult to rub off.

Oils applied by these methods do not remain in the bearing for long periods but eventually leak out the ends and are not normally reused. Consequently, special anti-oxidation characteristics, that assure long service life, are not required.

In the paper mill, bearings on which this type of general-purpose oil would be used are sometimes found on line-shafts, rotary cutters, roll stands, winders, rewinders, and dryer-roll bearings of old paper machines. They may also be used on roller chains, and where high-quality oils of this type are used, they are also suitable for use in bath- or ring-oiled bearings where service conditions are mild, and in gear cases that leak excessively.

Low temperature oils and greases

At low temperatures, the operator needs to be concerned about three conditions that the lubricant affects.

1. Will the lubricant cause so much drag that machinery can not be started.
2. In the case of gears, will they channel through the lubricant and operate without lubrication.
3. Will the hydraulic fluid cause pump cavitation because it does not flow to the pump suction.

With respect to oil, the two properties involved are its viscosity at the low temperature and its channel or pour points. Oil suitable for lubricating gear drives will have a channel point that is not higher than the normal low temperatures expected during the winter months. Such an oil will permit starting without unduly over-

loading the starting motor. However, its viscosity at operating temperature must be sufficiently high to protect against wear.

For internal combustion engines, cross-graded oils are available that can be used all year in many areas. In far-northern climates it may be necessary to change to an SAE 5W20 oil for winter operation.

Hydraulic fluids must not have a viscosity of more than about 4000 SSU at the low temperature, otherwise it will not flow to the pump suction and the pump will cavitate. When there is a sufficient head of oil above the pump suction it may be possible to start up even though the oil pour point is somewhat above outdoor temperature providing the viscosity requirement is met.

Although a No. 1 consistency is often suitable for temperatures of 0°F, consistency alone does not govern a grease's suitability. Slumpability, pumpability and starting torque in the case of rolling-element bearings all have to be considered. Since some of these properties are not readily determined, it will usually be necessary to accept the supplier's recommendation for the proper grease to use under low-temperature conditions.

Except for oils used in internal combustion engines, low-temperature lubricants are not in general required to have special resistance to oxidation. This is because operating temperatures are not high, and the lubricant is usually changed to a summer oil after 5 to 6 months use.

In the pulp mill, yard equipment and machines in the wood room may require lubricants suitable for low-temperature service.

Greases

Before modern multi-service greases became available, at least three and sometimes four or five greases were required to satisfy the requirements of the various conditions in a paper mill. These included greases having properties for the following services:

1. Rolling-element bearings
2. Bearings splashed with water
3. Bearings operating at high temperatures
4. Bearings subjected to heavy loads
5. Bearings arranged for block grease
6. Bearings operating at low temperatures (discussed under "Low Temperatures").

Rolling-element bearings are arranged for lubrication with grease because of two principal advantages; (1) they will operate for long periods without relubrication, and (2) the grease helps to seal the bearing and protect it from the entrance of water and other contaminants.

Because of the requirement of long time service, grease for rolling-element bearings must be of special high quality. It must have both high-chemical and high-structural stability. In long time service, the first assures against the formation of oxy-products that cause grease to become stiff or hard in which condition it will no longer lubricate the bearing. The second assures that proper consistency will be maintained. For satisfactory lubrication, at low to high speeds, a grease must have the consistency needed at operating temperature to enable it to slump only gradually toward the raceways, where the rolling elements pick up a small quantity and distribute it over the surfaces requiring lubrication. Bearings that have machined-bronze or phenolic cages require a grease soft enough to penetrate the small clearances between the cages and the raceways. The grease must resist milling down and becoming so soft that it leaks from the bearing, or that it flows on to the races and causes high internal friction and high temperatures as the rolling elements push the grease out of their way. The grease structure must be such that oil does not separate excessively from the soap and leak out of the bearing. Excessive loss of oil from the grease leaves stiff or hard material and the bearing will run dry.

Grease must protect the bearing surfaces from rusting. Even a small amount of rust will result in premature failure of rolling-element bearings.

Rolling-element bearings of electric motors are one of the principal points where grease having the above properties is used.

Many bearings in the paper mill are splashed continuously or intermittently with water. Two conditions must be considered. Where a lot of water gets into a bearing the grease must be water repellent and resist being washed from the bearings. It must have a greater attraction for the metal surfaces than the water in order to assure lubrication and protect against rust. Under these conditions conventional calcium-soap greases have until recently been the usual type grease used.

Where small amounts of water enter a bearing, as in well-sealed rolling-element bearings, the grease must be capable of absorbing the water without appreciable change in consistency. Grease lacking this property should not be used in paper mills.

The problem of water contamination occurs in the wire- and press-section bearings, cylinder bearings and in various bearings in the wood room and pulp blending and refining machinery.

Exhaust-fan bearings and various bearings in the power house frequently operate at moderately high temperatures (under 300°F) as a result of ambient conditions. Grease used in bearings at such temperatures must not soften to such an extent that it runs out of the bearing. Where rolling-element bearings are involved, the grease must also have special resistance to oxidation at the high temperatures to assure freedom from deposits of hardened grease. Special greases were usually required for such service.

Where heavy loads are encountered a grease is required that contains special anti-wear or mild extreme-pressure additives. Greases containing such additives have, in the past, not had as high oxidation resistance as could be desired. Present day E.P. greases have been improved in this respect to such an extent that they have the chemical stability of even the best high-quality rolling-element greases.

Tapered-rolling bearings under heavy radial or thrust loads, such as on jordans, and many flexible couplings often require extreme-pressure greases.

Today multi-service grease is available that combines in one product all of the properties that have been discussed. This makes it possible in many mills to use one grease throughout the plant. The obvious advantages are fewer greases to stock and less chance of error by the oilerman.

In recently built mills, some machinery in the wood room is provided with centralized greasing systems. Grease applied by such systems generally has a somewhat softer consistency than would be required by other application devices. In addition, the grease must have a strong resistance to the separation of oil from the soap as a result of the pressure filtration that may occur at the pumps, and valves of these systems. Unless the grease has this resistance, hard deposits of soap may form that plug the lines, and the system will have to be disassembled for cleaning.

Some mills are still operating that have plain bearings with large cavities designed for block grease. The block grease selected for this service must be suitable for the particular temperature involved. In service, the grease surface next to the journal must not glaze or char, but must permit the journal to wipe off a thin uniform film of grease.

In pulp mills, bearings sometimes become contaminated with mild acid

(Continued on page 110)

Adhesives in the paper industry

Part VII (Continued) — Important adhesive forms — pressure sensitive adhesives; the vinyl alkyl ether polymers*

FROM vinyl polymer chemistry there has appeared a broad spectrum of useful resins, and almost as broad a collection of adhesive raw materials. Among the latter are the vinyl alkyl ether polymers which are basic for an important class of pressure sensitive adhesives.

In bulk, these resins are light in color; in film thicknesses, they appear water-white. They range from viscous, tacky types to tough, rubber-like products, and exhibit compatibility with a wide variety of useful modifiers—plasticizers, tackifiers and extenders.

The formulated adhesives can be applied from solvent solution or extruded directly onto paper, cellophane, vinyl or other substrates.

The formula for the vinyl alkyl ether monomer is, where R represents

$$H-C=C-O-R,$$

a low molecular weight alkyl group, such as methyl, ethyl, propyl, etc.

Although some earlier work had been done, the first successful polymerization of vinyl alkyl ethers to form useful pressure-sensitive adhesives was conducted during World War I, by W. Reppe and co-workers at I. G. Farben in Germany. A low temperature, catalyzed reaction was employed. The polymers produced by this reaction, which was violent and instantaneous, were highly branched, tacky products exhibiting a low degree of crystallinity. Only limited control could be maintained over this flash polymerization.

A proliferous-type polymerization, which these workers had not been able to perfect, proceeds over a relatively long period of time, and results in long chain, only slightly branched molecules. These products are more crystalline and rubbery in character.

A major development permitting good control of process variables and product type, was the discovery of a new polymerization catalyst by S. A. Mosley (U. S. Patent 2,549,921). With this catalyst, a specially prepared aluminum hexahydrosulfate, the polymerization reaction can be conducted at the reflux temperature of the process medium, for example, toluene or hexane. The reaction temperature cannot exceed the temperature of the boiling solvent, and automatic temperature control results. By the deliberate variation of other factors, products varying in degree of polymerization are synthesized.

Since no undesirable by-products are formed during the reaction, the entire reactor product is simply filtered and adjusted for total solids, to give a final product dissolved in a practical solvent; or the reactor product may be dried to produce a solvent-free form.

Properties

The reduced viscosities of a series of commercial vinyl alkyl ether polymers will yield a rough idea of the wide variation in product characteristics available. In the "Bakelite" polyvinyl ethyl ethers, there are three principal products in solution form (also available as solvent-free resins). Resin EHBC is a hexane solution containing 80 per cent of a low molecular weight product. This resin has a reduced viscosity of 0.2 to 0.4. Such a material has low cohesive strength, but is used as a tackifier with resins of higher reduced viscosity to achieve the proper balance of properties.

Resin EHBM is a 25 per cent solution of a high molecular weight resin. Its reduced viscosity ranges from 3.5 to 4.5. It possesses high cohesive strength and low creep properties.

Similar to the latter product is EHBN, a recently developed material with a reduced viscosity of 4.5 to 5.5. This very high molecular weight polymer has even higher cohesive strength than the EHBM resin.

The vinyl alkyl ether polymers, and probably all pressure sensitive adhesives, are non-linear visco-elastic materials; that is, they display in some degree the properties of a viscous liquid, as well as those of a true elastomer. The elastic properties increase with increase in molecular weight and with decrease in the degree of branching in the polymer molecule. In the same system of materials, that is polymers produced under similar process conditions, the elastic properties will also be found to increase fairly regularly with increase in reduced viscosity.

The compatibility of the polyvinyl ethyl ethers permits of formulation

(Continued on page 111)

*Contributed by Union Carbide Plastics Co.

Clarifying high-color, low-turbidity water

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Part II – Four case histories and operating experiences in water clarification

THE installations discussed in Part II involve the Graver Reactivator, a high-rate, solids-contact unit which provides for massive contact of influent water, chemicals and recirculating sludge. Fig. 5 schematically depicts the internal cross section of the unit. Raw water enters the draft tube generally just below the variable speed recirculator. The recirculator or impeller is in effect a pump that delivers water from the mixing to the flocculation zone of the unit and then returns some of the sludge and water mixture back to the lower draft tube. In the process the recirculator achieves complete chemical dispersion.

The flocculation zone of the unit is a physically distinct section where floc particles are formed and grow to settleable sizes. This is because the intimate mixing with chemicals and previously formed sludge already achieved in the draft tube is followed in the flocculating zone by prolonged and controlled contact with the previously formed precipitates. Proper gentle agitation is provided by the central recirculator.

The Reactivator operates with a very deep clear-water zone outside of the flocculation area. The sludge level in the machine is carried quite low, usually 6 to 10 ft. below the collection system. Carrying the sludge level at this low point can be helpful in clarification of highly colored waters. The lower the sludge level the less the possibility of an upset in the machine resulting in carry-over of the light floc.

A final point about this machine concerns sludge removal. The unit is provided at the bottom with a positive means of removal of excess sludge. This is a mechanical scraping device which delivers sludge to a central sludge concentrator where it is further thickened before being removed through the timer or meter-controlled blow-down valve.

Following are clarification data from plants engaged in the manufacture of paper products of various types. Some of these plants require the lowest possible color in the effluent from the clarifiers.

Plant 1

The first plant is located at a large Florida paper mill which produces a bleached pulp of over 86 G.E. final brightness from the pulp dryer. The flow sheet is shown in Fig. 6 and the operating conditions and treatment results in Table I. This plant includes three 80 ft dia. by 10 ft high Reactivators. Raw water and chemicals are fed into a raw water flash mixer which is approximately 12 ft dia. by 20 ft high. It should be noted that the raw water and chemicals enter the central portion of this concrete tank and that the peripheral portion of the tank is used to collect the effluent from the three machines. The Reactivators are followed by eight rectangular gravity filters.

It should be noted from Table I that as the color is increased to 500 ppm the most effective clarification occurred at a low pH (approaching

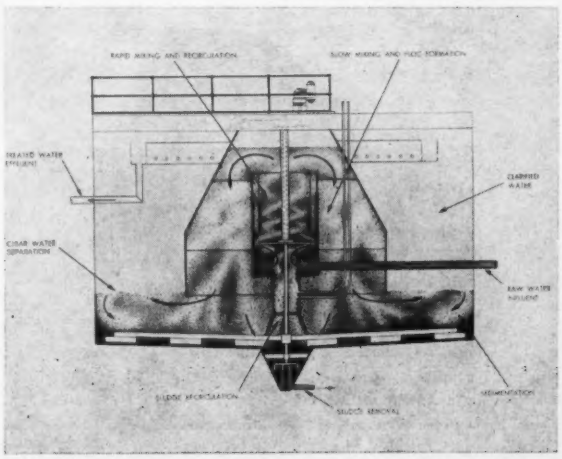

Fig. 5 — Cut-away of Graver Reactivator showing flow pattern.

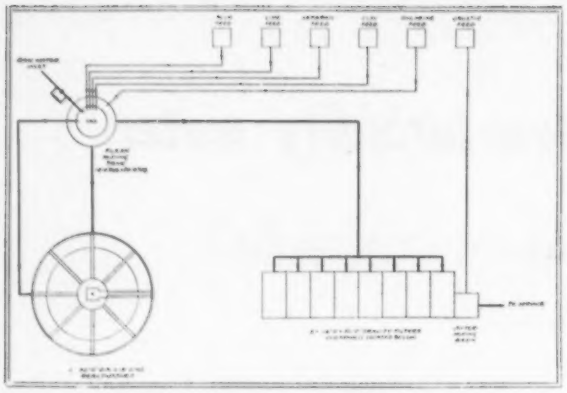

Fig. 6. Flow-diagram of Plant 1.

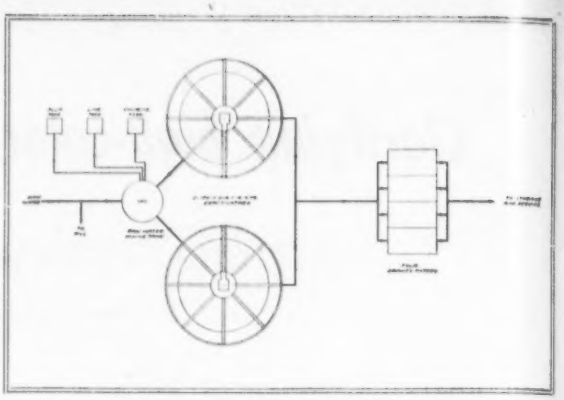

Fig. 7. Flow-diagram of Plant 2.

4.8). In addition, we should point out that activated silica was also used as a coagulant aid at this plant with success. A 3 ppm dosage level of activated silica was required. The cost is approximately the same as for 0.25 ppm of Separan. However, with activated silica as the coagulant aid at influent color levels of 300 to 500 ppm, reduction in color was not possible below 10 to 20 ppm. This did not equal the results obtained with Separan.

This water treatment plant was designed for 15 MGD and has been run at a 10 per cent higher flow rate. The rise rate in the clarifiers when operating at 15 MGD is 0.75 gpm/sq. ft. The filtration rate is 3.1 gpm/sq. ft. The plant was conservatively designed to handle extremely high color conditions which at times run as high as 700 ppm.

Plant 2

A high brightness pulp is also produced at another Southeastern paper

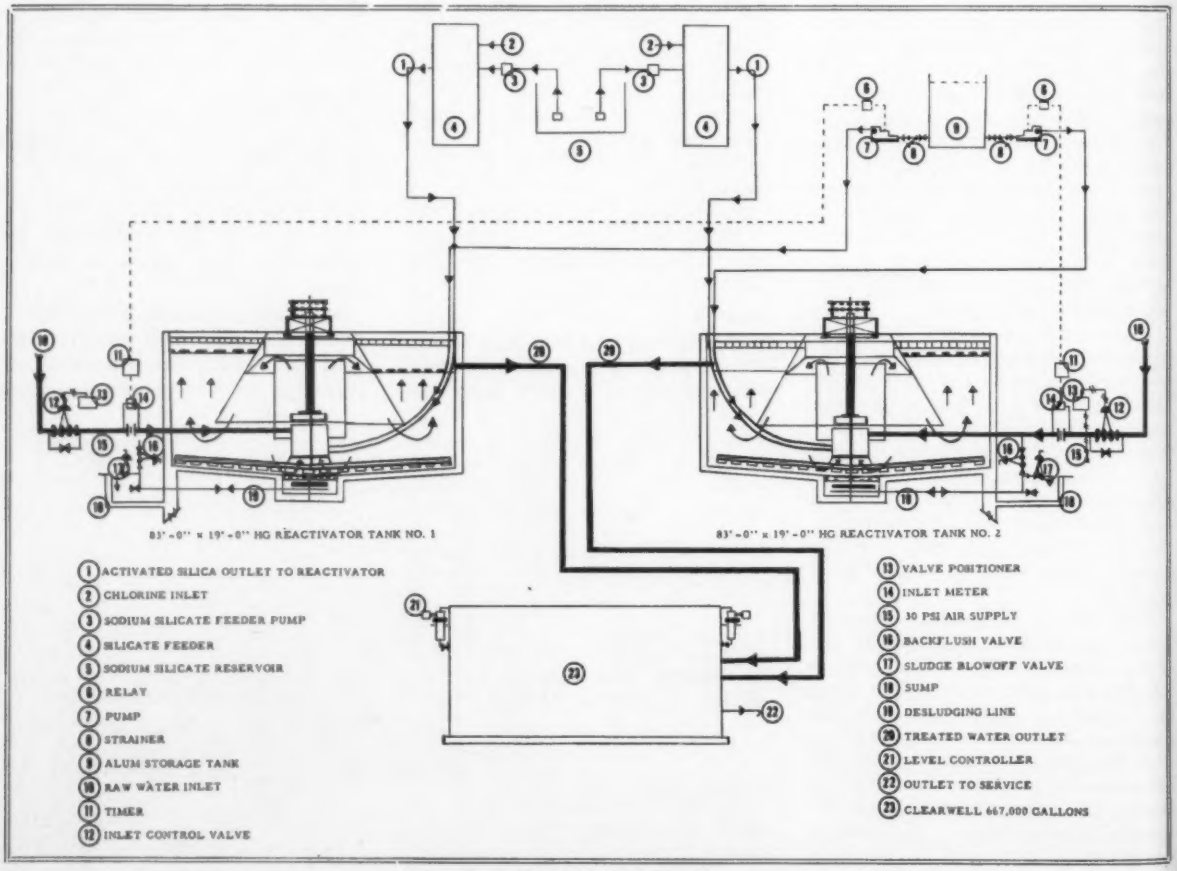

Fig. 8. Flow-diagram of Plant 3.

TABLE I

TYPICAL TREATMENT CONDITIONS AND RESULTS
FLORIDA PAPER MILL

	Influent	Filtered Effluent	CHEMICALS FOR COAGULATION			
			Alum, ppm	Lime, ppm	Clay, ppm	Separan, ppm
Turbidity, ppm	0-5	0				
Color, ppm	50-150	< 5	3-4	0	1	0
	150-250	5	4-5	For pH Adjustment to 4.8-5.7	1	0.25
	300-500	5-15	5-7		1	0.25
pH	5.6-7.3	4.8-5.1				

TABLE II

PARTIAL OPERATING RESULTS
SOUTHEASTERN PAPER MILL

	INFLUENT	EFFLUENT BEFORE FILTERS
Color, ppm	7-30	< 5
Turbidity, ppm	21	< 1.5
Total Dissolved Solids, ppm	120	108
pH	7.5	6.2

TABLE III

PARTIAL OPERATING RESULTS
ALABAMA KRAFT MILL

	INFLUENT	EFFLUENT
Color, ppm	40-100	< 10
Turbidity, ppm	40-300	< 10
pH	7-8	8.3
Chemical Feeds	Liquid Alum – 2 Grains/Gallon Silica (Chlorine Activated) – 2 ppm	

TABLE IV

TYPICAL TREATMENT DATA
ALABAMA PAPER MILL

	INFLUENT		EFFLUENT		TYPICAL CHEMICAL FEED		
	Average	Maximum	Average	Maximum	30% Alum, ppm	Activated Silica, ppm	7% Caustic Soda, ppm
Turbidity, ppm	60-70	400-500	1.5	< 5	60	3	200
Color, ppm	20	> 30	1-2	< 5			

mill which utilizes high-rate clarification machines for color and turbidity reduction. The flow sheet for this system is shown schematically in Fig. 7. Once again the raw water and chemicals enter a mixing basin which precedes the two 120-ft.-dia by 18½-ft. high Reactivators. The system is designed to handle a total of 26 MGD at a rise rate of 0.9 gpm/sq. ft. with a total detention time of approximately 180 min. The units have been operated at flow rates 10 per cent above the design capacity without any appreciable changes in results. Typical average operating data are shown in

(Continued on page 111)

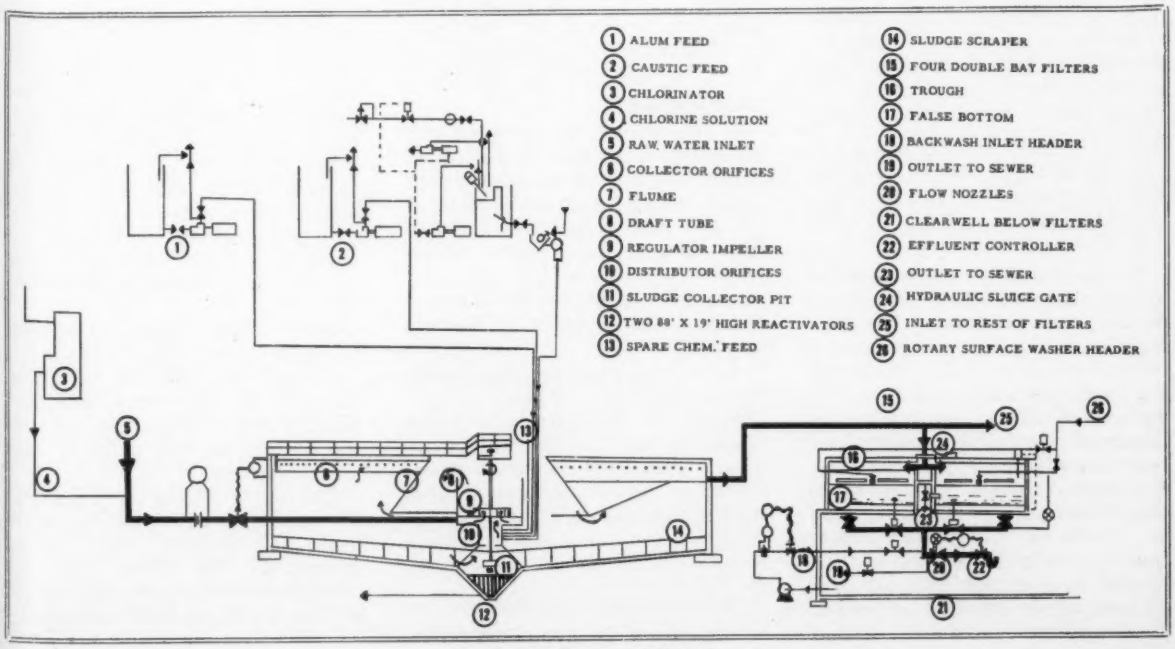

Fig. 9. Flow-diagram of Plant 4.

The use of pipe, fittings, pumps and valves in the pulp and paper industry

ROLAND L. ALLEN JR.
Vice President, Eastern Engineering Co.

Part XII — Application of pipe, fittings, pumps and valves in pulp bleaching

THE MODERN chemical pulp bleach plant usually consists of at least three of the following bleach stages:

1. Chlorination
2. Caustic Extraction
3. Hypochlorite
4. Chlorine Dioxide
5. Peroxide

A modern mechanical pulp bleach plant usually consists of either a peroxide or hydrosulfite stage or both.

All bleach stages have conditions that affect the materials of which they are constructed. In general, these conditions may be defined as belonging in the following categories:

1. Pressure
2. Temperature
3. Corrosion
4. Contamination

To be selected, a material must be able to serve satisfactorily from each of the above standpoints. The additional condition of economics, of course, must be satisfied. A material is the most economical when the cost per unit of time is lowest when the factors of installed cost, maintenance cost and service life are all considered. For some products, the additional characteristic of contamination must be considered. Contamination may ruin the quality of the end product, or may increase manufacturing costs by lowering the efficiency or yield of the raw materials utilized. An example of this is the decomposition of peroxides by heavy metals and, therefore, the wastage of expensive peroxides.

One other characteristic or condition must be investigated before the final selection of the material of construction can be made. This final characteristic or condition is availability. The materials discussed below are all available in the sizes and forms required. When new materials are considered, however, the availability of the new materials, in the sizes and forms required, must be considered.

Chlorination

In the past, rubber has been considered the most practical material of construction for the chlorination stage piping, fittings, and valves. Since it has not been practical to construct these components of solid rubber, rubber lined steel or cast iron pipe, valves, and fittings have been used to withstand the pressures encountered in practice.

A practical approach to the installation of rubber lined piping is to prefabricate the steel piping into the largest sections that can be conveniently rubber lined. Attention should also be given to the problems of erecting the prefabricated sections. By careful study, the system can be divided into sections that can be erected without difficulty.

The steel pipe may be standard weight ASTM A-53 pipe or ASTM A-139, Grade "B" spiral welded pipe. The spiral welded pipe should be of the following wall thicknesses:

4½ in. OD through 8⅝ in. OD ..... 0.1046 in. (12 MSG)
10¾ in. OD through 16 in. OD ..... 0.1345 in. (10 MSG)
18 in. OD through 24 in. OD ..... 0.1644 in. (8 MSG)
Larger than 24 in. OD ..... 0.1943 in. (6 MSG)

The inside of the pipe and fittings should be protected with ⅛ in. rubber lining for sizes 5 inch and smaller and 3/16 in. for sizes 6 inch and larger. The rubber lining should be of a type to resist the action of chlorinated stock and white water. The lining should be bonded to the metal during the process of vulcanization and should extend over the full face of flanges. After vulcanization, the finished lining should be electrostatically tested.

After rubber lining, no welding should be done on the stel pipe.

Rubber lined flanged cast iron valves of the pulp stock, gate, and Saunders patent diaphragm types are available in the full range of sizes usually required.

Chlorinated stock is rarely pumped. The system can usually be designed to locate the required pump before chlorination. The filtrate from the chlorination washer can be handled with type 316 stainless steel pumps.

(Continued on page 112)

New ceramic cones for Bauer cleaners

Attaching white Baueramic cone to a Centri-Cleaner.

The new ceramic cones have exceptional resistance to friction, abrasion, heat and shock. They consequently reduce downtime by outlasting even the hardest metallic alloys and cost less.

A NEW ceramic cone for Centri-Cleaners—far outlasting cones and tips made of even the hardest metallic alloys—has been developed by the cleaner research laboratory of The Bauer Bros. Co.

From all indications, this development in Bauer's continuous research on cleaners will provide the industry with realistic savings in maintenance and downtime.

An interesting feature of the "Baueramic" cones is that they are made of the same special ceramic material which is used on the nose cones of outer space missiles and rockets. This is the only material which has been found practical and suitable to protect such space vehicles from the intense heat and terrific friction encountered during re-entry into the earth's atmosphere at supersonic speeds. The material will not burn and it has the strength of cast iron.

This unique combination of desirable physical qualities—extreme resistance to friction, heat and shock—will greatly extend the service life of Centri-Cleaners in all pulp cleaning applications. The new cones are especially recommended for cleaners handling pulp containing abrasive materials.

Since Centri-Cleaners operate through the application of the free vortex principle, maximum centrifugal force is encountered at the bottom orifice, where rejected material is discharged. It is in this area, therefore, that wear is normally most evident due to the combination of pulp velocity, maximum centrifugal force and the heavier concentration of grit, sand, dirt, bark specks, and other material being rejected. It is for this area of maximum friction and wear that the new ceramic cones have been designed.

Self polishing action cuts wear

Another factor which reduces cone wear is the smoothness of the unit's interior surfaces. This smooth, hard interior is produced by a self-polishing action as the pulp moves across it. Thus, the cones become smoother in operation, further reducing friction and wear.

Units tested in mill operations

Before announcing the availability of the new ceramic cones to the industry in general, Bauer field tested the new attachments in various severe pulp cleaning applications.

In one instance, in a wastepaper mill where the stock, prior to being cleaned contained a high degree of glass contamination, Baueramic cones were installed on No. 623-4 Centri-Cleaners in the secondary stage. For comparison, some cleaners in the same stage were equipped with cones made of the hardest metallic alloys possible to obtain.

After two months of operation, the ceramic showed absolutely no signs of wear, while the metallic cones showed appreciable wear and were ready to be replaced.

In another mill, where highly abrasive pulp caused a serious wear problem, Baueramic cones were installed on the Centri-Cleaners on a 9 pt. machine. No wear was evident on the ceramic cones after 5 months of continuous operation.

While the rejects were of high consistency in this installation, the Baueramic-equipped cleaners never plugged,

(Continued on page 112)

S. D. Warren's expansion

(Continued from page 100)

of the seal tank receives the white water from the drop leg of the thickener and this is the only white water that is rejected to the sewer.

White water from the paper machine is used for (1) dilution of stock before it goes to the refiners, (2) consistency regulation, (3) dilution of broke and broke handling, etc.

Dye mixing system

A completely new system for mixing and storage of dyes is in operation at the mill. This consists of two 500-gal. stainless steel mixing tanks, 12 stainless steel dye storage tanks of 1,000 gal. capacity each, 12 stainless steel pumps of 20 gpm capacity and plastic piping.

Dyes are weighed into the mixing tanks which then receive the required quantity of water from a batch water meter. Each batch of mixed dyes is then dropped to one of the 12 storage tanks. From here pumps circulate each dye solution through circulating headers to mixing hoppers located above each paper machine mixing tank. Dyes to each hopper are measured and controlled by small magnetic meters and stainless steel needle valves. The hoppers receive the dyes, additives, and pulps and, in turn, deliver the furnish to the mixing tanks. Each hopper is served its dyes by 3 or 4 small magnetic meters of 1/10-, 3/16- and ½-in. sizes. Quick disconnect hoses permit these meters to serve several dye circulation headers depending upon the grades being made.

The metering of dyes into the stainless steel hoppers as well as all stock flows into the hoppers are controlled from an instrument panel at each of the four paper machines.

Stock proportioning

Bleached-refined stock is pumped from the two high-density storage tanks through consistency regulators to two tile 14-ft. dia. by 15-ft. high surge tanks, one for bleached pine and one for bleached hardwood pulp. A third tile surge tank, 12-ft. dia. by 15-ft. high and located in the same area, receives unbleached pine stock through a consistency regulator directly from the unbleached storage system which also supplies the bleach plant.

Each of the three surge tanks is equipped with a return loop from which a portion of the stock is metered into the stainless steel hoppers. The balance of the stock is returned through a consistency regulator and automatic control valve to the surge tank for continuous circulation. Stock in the surge tank loops is under 15 psi pressure. The pressure transmitters are the flange or flush mounted differential type, with low pressure connection open to atmosphere.

All stock flow from the surge tanks is controlled from the central control panel which also includes:

1. Five consistency control instruments for bleached hardwood, bleached pine, unbleached pine, bleached broke and unbleached broke.
2. Low pressure and hi-low chest level alarm systems.
3. Seven chest level indicators.
4. Pump controls.
5. Agitator controls.

The flow of stocks, dyes and additives to the paper machines is handled by four stock blending systems—one for each of the four paper machines. Stock flow is metered by 3-, and 4-in. magnetic flow meters and controlled by 2-, 2½- and 3-in. Saunders patent type control valves.

The system supplying No. 1 machine handles four stocks (bleached hardwood, bleached pine, purchased pine and broke), four dyes and a number of additives (alum, fillers, acids and size).

The instrument panel serving No. 1 machine houses instruments that give the machine operator complete control of the blending operation. Here are mounted all the individual recording flow proportioning controllers for the four stocks, the dyes and additives. Here also are percentage setting mechanisms for the stocks, chest level controllers, regulators and dial percentage indicators which set the proper proportion of each stream to total system flow.

All the operator has to do is set the required proportion for each flow, turn a switch and the various controls then take over to automatically bring the whole system into operation.

The proportioning mechanism on each flow controller responds to the total machine demand signal from the mixing chest level controller. All controllers then automatically deliver their exact proportion of the individual stocks, additives and dyes which are shown directly on the dials.

The panel also houses a pH controller which corrects acidity in the stock by addition of alum. Also included are integrators for stocks and additives (for stock record purposes) and low flow alarms for stocks.

With minor variations the same instrumentation is mounted on each of the other three paper machine control panels.

The benefits which are already apparent from the installation of the new refining and stock proportioning system are listed by R. Tarr and W. Marra of S. D. Warren as follows:

1. Improved pulp quality
2. More flexible pulp mill to paper machine scheduling
3. Optimum fiber treatment resulting in maximum strength
4. Lower furnish cost because of increased use of hardwoods
5. Accurate measurement
6. More uniform product
7. Less waste
8. Less dirt and slime because of stainless steel equipment.

Lubricants

(Continued from page 103)

or alkali. An acid- or alkali-resistant grease is, of course, required for use in such bearings. Some of the multiservice greases are sufficiently acid and alkali resistant to be suitable for this service.

Specialty lubricants

Sometimes specialty lubricants are needed to meet unusual specific conditions. Among such requirements might be listed grease for digester valves; oils that form strong water-in-oil emulsions and are used in air cylinders and in plain all-loss-type bearings subject to water washing; greases for bearings in the power house that operate at temperatures above 300°F.

Other petroleum products

Paper mills use many materials made from petroleum that are not lubricants. These include waxes and wax emulsions; solvents for cleaning; rust preventives to protect spare parts in storage; cutting fluids for use in the machine shop; and fuel for steam boilers, gasoline and diesel engines.

An individual mill will not usually use all of the petroleum products mentioned in this article. Nevertheless, there may be required twenty grades of lubricant. To make sure they are used where intended, careful planning and scheduling of oilermen's routes is required. He should, of course, be provided with charts that indicate the lubricants recommended for each machine, thus minimizing the opportunity for costly errors that result when an individual's memory is depended upon.

Adhesives

(Continued from page 104)

with a host of other materials capable of modifying various characteristics important to specific applications.

Formulation

Formulation generally begins by selection of proportions of the low and high molecular weight resins. Typical starting points are 10 to 15 parts of the low molecular weight product EHBC with 90 to 85 parts of either the EHBM or EHBN. Proportions will depend upon the application.

If the bonding application is to be temporary, high tack may be desirable and creep relatively unimportant. In such cases, higher proportions of EHBC are used. Where the bonding is to be permanent, low creep and good nerve quality or cohesive strength are mandatory. Minimum proportions of EHBC are then to be used. Nerve quality is increased by the addition of "Neville" Hard Resin, in quantities as high as 20 per cent of the weight of polyvinyl ethyl ether. Additives exhibiting similar properties include "Piccopale" 100, "Naugapole" 1022 and others. Unusually low creep is imparted by 5 to 10 per cent of "Bakelite" resin CKR-2432. Adhesive strength reaches 60 oz./in.

Further adjustment of tack in these formulations can be effected by increasing the proportion of the EHBC resin, or by the addition of "Staybelite" Ester No. 10, "Piccolyte" S-125 or other modifiers.

For temporary bonding of surfaces, a minimum of adhesive transfer is desired. Transfer is partially a function of the backing material. Backing material that is matt-surfaced rather than glossy permits a better bond to be formed, and thereby less possibility of adhesive transfer. For a smooth surface backing, such as cellophane, a primer ("Hycar" Latex 1516 can be used) may offer improved results.

Applicable

The polyvinyl ethyl ether adhesives are generally applied in solvent solution to tapes or other backing material. They can also be extruded successfully. Extrusion temperatures are critical and should be determined by experiment for each formulation.

Applications for these pressure-sensitive adhesives are broad. The most commonly seen are the wall coverings of vinyl and other materials. Tapes for household as well as special industrial applications are produced on bases of paper, vinyl film, cellophane, cloth, polyester film and other equally diverse materials. The electrical properties of the vinyl ethyl ether resins are good—for example, the power factor at 60 to 1000 cycles, approaches that of polyethylene. Tapes for electrical applications, therefore, are practical.

In the form of double-sided tape, or applied directly, the pressure-sensitive adhesives provide the machinist with "third hands" to hold metal parts in perfect registration while they are being drilled or otherwise worked.

PRODUCT SOURCES

Bakelite CKR-2432 Resin	Union Carbide Plastics Co.
Bakelite Vinyl Ethyl Ether Resins	Union Carbide Plastics Co.
Hycar Latex 1516	B. F. Goodrich Chemical Co.
Naugapole 1022	Naugatuck Chemical Co.
Neville Hard Resin	Neville Chemical Co.
Piccolyte S-125	Pennsylvania Industrial Chemical Corp.
Piccopale 100	Pennsylvania Industrial Chemical Corp.
Staybelite Ester No. 10	Hercules Powder Co.

Water clarification

(Continued from page 107)

Table II. The chemical feeds required for proper treatment are liquid alum at a dosage of 1.5 grains/gallon, lime for pH adjustment and chlorine.

Plant 3

The flow sheet for a water treating installation at a paper plant in Alabama which produces unbleached kraft is shown in Fig. 8. This plant includes two 10 MGD Reactivators. The plant does not require filters since the quality water which the Reactivators produce is sufficient for plant purposes. The Reactivators are 83 ft. in diameter and designed to operate at a rise rate of 1.5 gpm/sq. ft. which approximately 105 min. total detention time in each unit.

Each Reactivator is furnished with an inlet orifice-type recording flow meter complete with an electrical contactor to provide chemical feed control, a set of chemical feeders, a flow control valve, and a liquid level controller mounted on the concrete outer shells of the units. Chemicals are fed directly into the draft tubes of the clarifiers. Typical operation data are shown in Table III. Liquid caustic is sometimes fed for pH adjustment. When the units are operated at flows as high as 8000 gpm each, which is approximately 15 per cent above design rate or equal to a rise rate of almost 1.75 gpm/sq. ft., results do not differ from those shown in Table III.

Plant 4

The final installation is located at another Alabama paper mill which in this case produces a high brightness pulp. The flow sheet of this plant is shown in Fig. 9. The two 88 ft.-dia. clarifiers operate at a design rate of 10 MGD and a rise rate of 1.25 gpm/sq. ft. with a total detention time in each unit of approximately 110 min. Typical treatment data are shown in Table IV.

The silica is activated with sodium carbonate. Chlorine is fed to the clarifier effluent and a 0.1 ppm chlorine residual is maintained in the effluent from the filter plant. Sulfite is fed to remove the residual chlorine from that portion of the water which flows through a boiler feedwater demineralizer. These machines have been run at flow rates 30 per cent over the design

rate and still produce satisfactory water turbidities averaging between 5 and 10 ppm. and color approximately 5 ppm.

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Pipe, fittings, pumps and valves

(Continued from page 108)

In the future, plastic lined steel and reinforced plastics will probably replace rubber as the standard material of construction for pipe, fittings, and valves for the chlorination stage. Some plastic materials such as polyethylene coated steel and resin bonded fiberglas have already been used, to a limited extent, with success.

Caustic extraction, peroxide and hydrosulfite

The piping, valves, fittings, and pumps used in the caustic extraction, peroxide, and hydrosulfite stages should be constructed of type 304 stainless steel. Carbon steel piping has been used for the caustic extraction stage with a degree of success during periods when stainless steel was in short supply. This is not normally recommended, but is mentioned as a solution in an emergency.

Hypochlorite

The piping, valves, fittings, and pumps used in the hypochlorite stage should be constructed of type 316 stainless steel. However, type 304 stainless steel has been used with success in some mills.

Chlorine dioxide

The chlorine dioxide stage is usually of the high density type with an upflow tower or an upflow preretention tube and downflow tower. This arrangement is necessary since chlorine dioxide solution is not stable at the elevated temperature employed, and must be kept under pressure until the major part of the reaction has taken place.

The pulp is usually between 10 and 15 per cent consistency and is heated by direct steam to 140 to 180°F. It is forced into the bottom of the tower or preretention tube by a positive displacement pump or a compressed air type feeder.

The chlorine dioxide solution is mixed with the pulp just prior to its entrance into the tower or tube, or in the bottom of the tower. The point at which the hot pulp and the chlorine dioxide solution are brought together is subject to very severe corrosion.

The combination of pressure, temperature and corrosion greatly restricts the number of materials of construction that may be satisfactorily employed. Titanium is about the only commercially available metal that is satisfactorily resistant, but it is still so expensive that it cannot be economically employed in any great quantity. Hastelloy "C" has been used to a limited extent, but is not satisfactorily resistant and must be replaced periodically. Glass lined steel gives excellent service for pipe and fittings at a comparatively low cost. None of the plastics currently available can be used. They all must be discarded for one or more reasons. Usually, the strength of a corrosion resistant plastic at the service temperature is so low that the pressure cannot be handled. This would seem to indicate that plastic lined steel might serve satisfactorily. At the present time none of the resistant plastics (such as Teflon) are used to line steel pipe and fittings in the large sizes required.

After the reaction has taken place in the tower, the corrosive conditions are much less severe. All pipe, valves, fittings, and pumps for stock and filtrate service from the discharge of the tower through the chlorine dioxide washer will give satisfactory service if constructed of type 317 stainless steel.

Process vents

Vents from towers, seal boxes, and washers have been successfully piped to the outside with transite vent duct, resin bonded fiberglas duct, polyvinyl chloride duct, and polyethylene coated steel pipe.

Foam from seal boxes may be handled in resin bonded fiberglas, polyvinyl chloride and polyethylene coated steel.

Conclusion

Discussions of pipe, fittings, valves, and pumps for hot and cold water, steam, and the various bleach chemical services have been given in previous parts of this series.

New ceramic cones

(Continued from page 109)

a problem encountered with some previously used cones.

Thus, this new development solved two major cleaning problems in these mills—excess wear and plugging.

Availability and costs

Baueramic cones are available as an optional feature on all Centri-Cleaners. On the larger cleaners, such as the 12 in. and 6 in. series, the cone actually takes the place of the two lower parts of the original cleaner (the lower cone and underflow nozzle). On the smaller No. 600 cleaner, the Baueramic attachment is an underflow nozzle.

The cones can be specified when ordering new cleaners or they can be supplied for cleaners already installed in mills. Attachment of the cone in the field is easy since no special tools are required. The cone is held in place by a plastic-coated clamp ring.

Because of the savings in maintenance the new cones provide, many current orders for cleaners specify Baueramic cones and shipments of cleaners equipped with these new parts are being made daily.

The ceramic cones cost less than the special metallic alloy cones which Bauer has had on the market for some time.

Shock resistance

Although Baueramic cones are not intended to be man-handled and exposed to violent shock treatment, it is interesting to note that these parts do have good shock resistance. This was illustrated during testing by striking one of the small cones repeatedly with a hammer and by dropping it on a concrete floor. In the great majority of such rigid tests, the ceramic parts remained undamaged. It must be emphasized, however, that the above tests are not recommended as a standard procedure and that they have little if any bearing on the value and long life of the part in actual operation.

The ceramic material itself is very hard and has been described as "as strong as cast iron". It is so hard that cutting it can be accomplished only with a diamond wheel.

Outlasts metallic alloys

Another example of how this unusual ceramic is used in industry comes from the oil fields, where it is used to handle drilling mud. In this application it has outlasted the most wear-resisting metallic alloys by a 10 to 1 ratio.

Bauer Pump-Through Refiners

refining waste paper

Users of Bauer Pump-Through Refiners working on waste paper for boxboard, liner, 9-point, etc., report how they . . .

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A single pass through one refiner produces stock fiberization and dispersal which can not be equalled even by a series of several jordans.

● IMPROVE QUALITY

These refiners preserve fiber length. Stock is therefore stronger and freer draining. This provides improved formation, improved quality.

● INCREASE MACHINE SPEED

Better formation means better runnability, increased operating speed.

● REDUCE LABOR COSTS

Low cost of plates, and ease of changing them, reduces labor costs, maintenance and downtime.

Talk to your Bauer representative . . . see for yourself why so many waste paper and de-ink mills are using Bauer Pump-Through Refiners.

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SPRINGFIELD, OHIO

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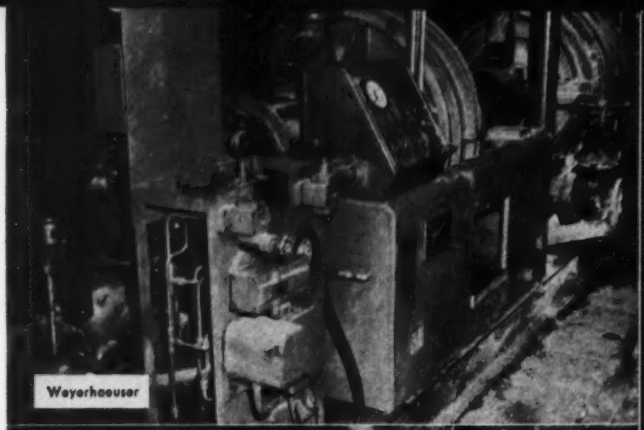

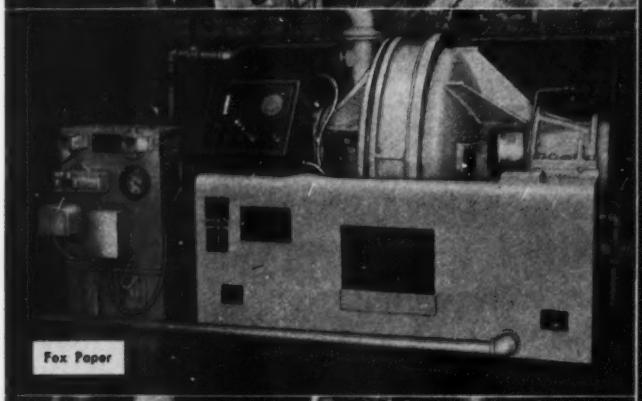

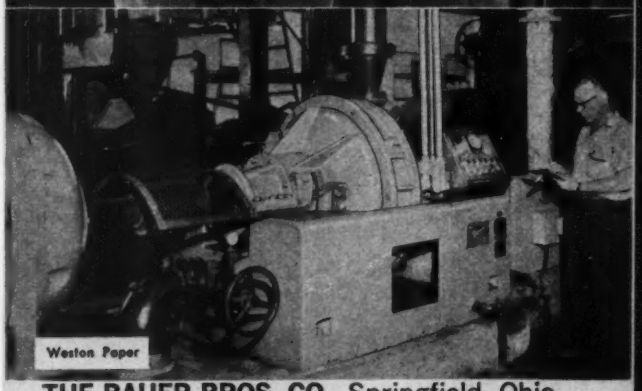

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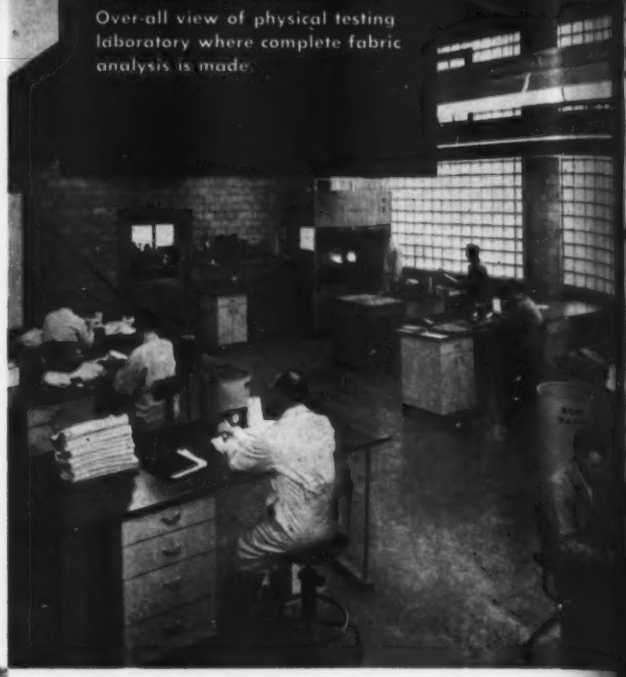

Over-all view of physical testing laboratory where complete fabric analysis is made.

...sely air conditioned ... precise ...ting work, this room houses the large ...stron that measures tension and resistance to compression over the range of 0.001 lb. to 2000 lbs.

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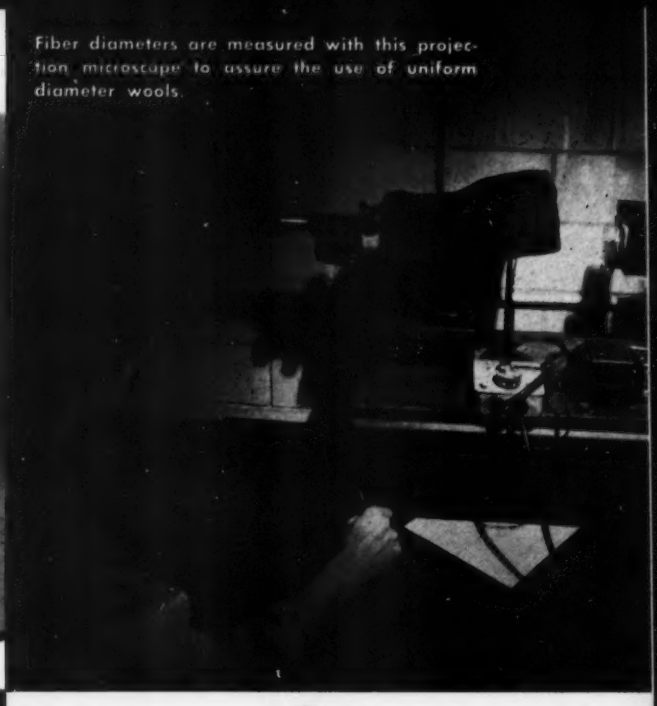
The instruments, facilities and scientists pictured are in addition to the many devoted exclusively to customer service. They represent Huyck's investment in feltmaking progress that is unsurpassed in the felt industry. You are invited to view these pictures carefully and ask your Huyck Sales and Service Engineers how each device and service can improve your felt operations.

The Vapor Fractometer, the modern tool for performing chromatographic analyses, accurately seeks out types of felt damage.

Fiber diameters are measured with this projection microscope to assure the use of uniform diameter wools.



One of two Instrons, sensitive instruments used to measure the strength and resilience of felts, yarns and individual fibers.

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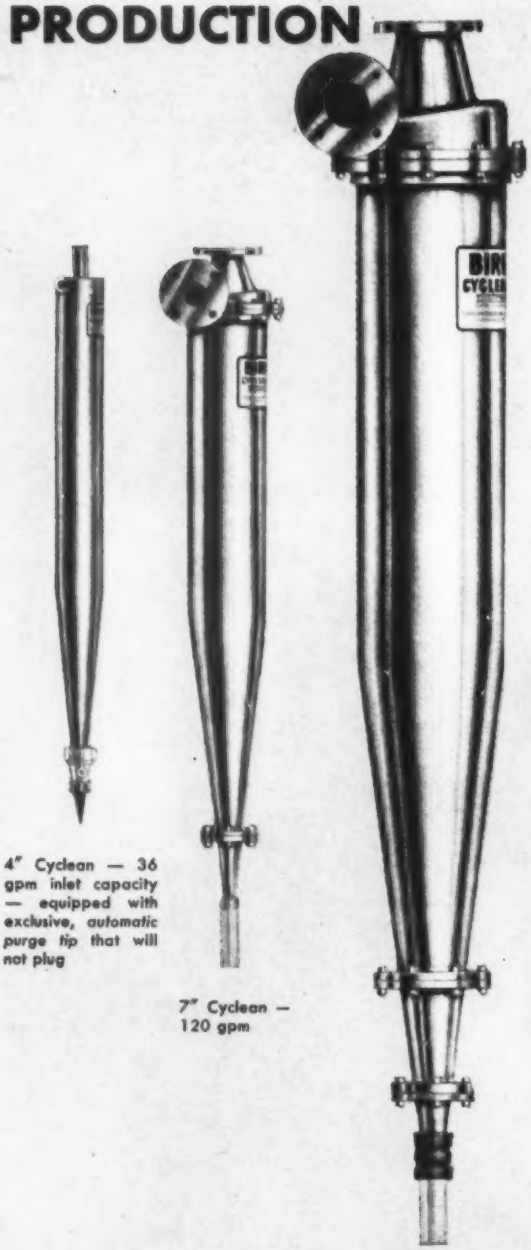

4" Cyclean — 36 gpm inlet capacity — equipped with exclusive, automatic purge tip that will not plug

7" Cyclean — 120 gpm

12" Cyclean — 500 or 850 gpm

These stainless steel, pressure drop cleaning units are designed, constructed and applied by engineers responsible for a major part of all the pulp and paper dirt removal equipment operating in this country's mills.

Cyclean users report more effective removal of shives and specks, improved fibre hydration, fewer breaks, fewer wash-ups, increased wire life and significant increases in machine output.

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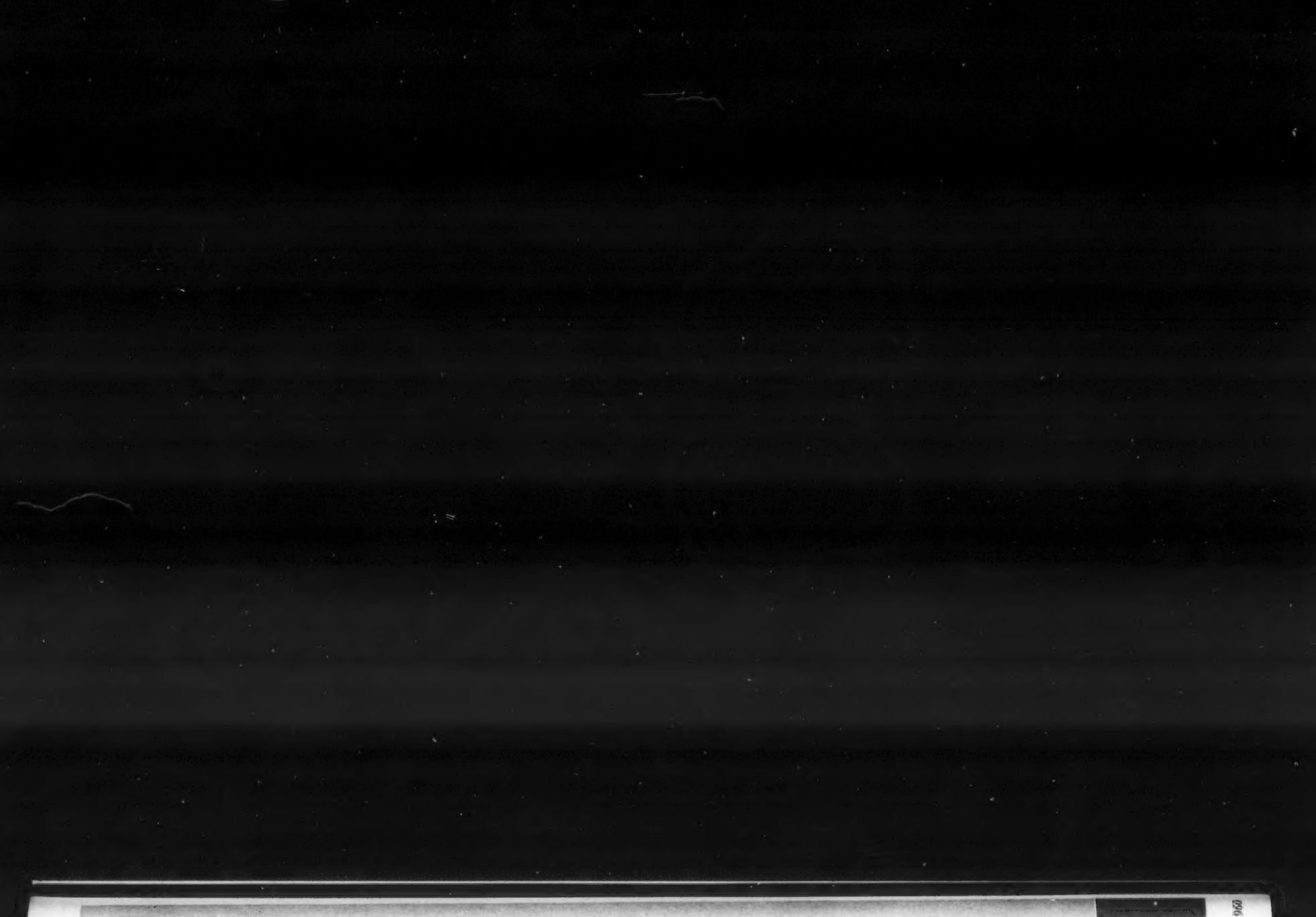

CURRENT COMMENTS

Our expanding economy in Europe — Uncle Sam pushes "hard sale" program

WARREN B. BULLOCK

"If you can't beat them, join them." This policy, expressed more graciously but no less forcibly, is given as the probable attitude of the United States Paper Industry toward the Customs Unions formed in Europe for mutual community development as against the outside world.

Howard E. Whittaker, chairman of Mead Corp. and president of the API-PA, in answering a question during a press conference as to how this country would meet the program of Customs Unions abroad, stated that U.S. mills are already establishing branches in Europe and that the policy of investment in paper mills abroad would undoubtedly grow rapidly.

John R. Kimberly, chairman of Kimberly-Clark Corp., in a letter to stockholders, announced acquisition of a controlling interest in Societe Sopalin, a converter and distributor of tissue and paper products in France and North Africa. Mr. Kimberly said: "Our co-shareholder is Societe Anonyme des Papeteries Darblay, an established French manufacturer of a wide range of papers. This move will fortify our existing position in the rapidly expanding economy of the European Common Market countries."

It has already been announced that Scott Paper and International Paper have completed plans for co-operative ventures within the Belgian and German segments of the European Common Market. Union Bag-Camp has acquired a half interest in the Cargal enterprises in the Middle East in order to secure its share of the demand for corrugated containers in the Mediterranean area.

Maintain export markets

Meanwhile, however, Uncle Sam is advocating a "hard sale" program to maintain the nation's export markets, and Secretary Mueller of the Department of Commerce has announced a new program to help business with the job of sales promotion. As part of this campaign, conferences are being held by Commerce Department officials with representatives of various industries. At one of these conferences late in March, paper company executives cited examples of the problems which American paper exporters will find in the European common markets. One such example was that of the projected 20 per cent reduction in the British duty rate on paperboard offered to Norway and Sweden, co-members in the Outer Seven Common Market, already the principal competitors of the U.S. for the British paperboard market.

Still another move to help the domestic industry in its foreign trade is the proposal that the Export-Import Bank guarantee exporters against losses arising from political risks abroad. Such risks would be seizures of property, barriers to imports, and losses due to war or civil strife. Such a program would have to be approved by Congress.

Demand grows for lightweight papers

The annual convention of the National Paper Trade Association, held at New York the last of March, was told by its president, Floyd H. Blackman, head of Stone & Forsythe Co., that merchants can expect a 10 per cent increase in sales of printing and industrial papers during 1960. George W. McCleary, director of printing and specialty sales for Ecusta Paper Co., a division of Olin-Mathieson Chemical Corp., said that the demand for lightweight papers in the next five years will grow faster than for any other grade. G. Willing Pepper, vice president of Scott Paper Co., told the convention that through lax selling methods, the industry has not kept itself equipped to find adequate markets for the high productive capacity it has today.

Shutdown in Cuba

Castro's seizure of cane sugar plantations and sugar mills is having an adverse reaction on Cuba's production of paper from bagasse. The island has enormous quantities of bagasse; and a paper mill built by American capital was producing newsprint, tissue paper and paperboard from the sugar cane waste. Now Castro has placed an embargo on imports of the chemicals which are needed to break down the fiber, and bagasse is once more usable only for fuel. The mill has ceased operation and its employees are out of work.

Russia exports pulp

Statements at the paper industry convention in New York that Russia might seek to secure dollars by exports of pulp to the United States, despite the need for pulp at home, were confirmed by a recent Government report.

In December, Russia shipped 875 tons of unbleached sulfite and 1,021 tons of bleached sulfite. Declared import value of the unbleached pulp was approximately $82 per short ton as against the ruling price of $135 for Swedish pulp, freight allowed, and the price of the bleached pulp was approximately $104.50, as against the Swedish price of $155.

Net Incomes

Allied Paper Corp.—Net income for 1959, $1,780,173; a year ago, $520,459.

SCAPA

GROUP "C"

SYNTHO-ASBESTOS Dryer Felts

incorporate our exclusive

* "3-DECKER" STRUCTURE

- Dacron-Nylon Working Face
- Syn-Reinforced Asbestos Center
- Syn-Reinforced Cotton Back

(Approx. 25% Synthetic Content)

They insure excellent drying, combined with unusually high resistance to thermal, chemical and mechanical degradation.

Types 3175-C (SRA) and 3480-C (SRA) supplied in all widths either open-ended or with Clipper Seam.

Type 3980-C (SRA) supplied endless with hand-spliced seam.

*World Patents Granted and Pending

SCAPA DRYERS, INC. WAYCROSS GEORGIA

SELLING AGENTS

Morey Paper Mill Supply Company
309 SOUTH STREET, FITCHBURG, MASS.

John B. Chandler Co.
1735 OCEAN FRONT, ATLANTIC BEACH, FLA.

Tipka Supply Company
415 JACKSON ST., OREGON CITY, ORE.

For more data circle 123 on Post Card

Kimberly-Clark Corp.—Net income for nine months, $22,195,927; a year ago, $18,826,071. January quarter sales and net profit were the largest in the company's history.

Masonite Corp.—Net income for six months, $2,283,618; a year ago, $2,081,676.

Standard Packaging Corp.—Net income for 1959, $4,135,989; a year ago, $2,483,834. The 1959 figure does not include the $1,289,785 realized by the sale of timberlands.

West Virginia Pulp & Paper Co.—Net profit for four months ended February 29, $3,452,000; a year ago, $3,155,000.

Financial report

Paper mill securities experienced a general rise in values over the March prices, experiencing their share of the increased optimism over general business prospects for the balance of the year.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	Apr. 10, 1960	Mar. 10, 1960
American Can	41¼	39⅝
Same Pref.	37¼	* 37⅛-38
Celotex	32¼	30⅝
Same Pref.	18⅛	* 17⅞-18¼
Certain-Teed	12½	13
Champoon P & F Co.	34¾	36½
Same Pref.	91	* 89-91¼
Chesapeake of Va.	35	36¼
Container	26½	23⅞
Same Pref.	87½	* 83-86
Continental Can	43⅞	42½
Same Pref.	81	* 78-80
Crown Zellerbach	44	44⅝
Same Pref.	..	*100½-103
Diamond National	31¾	29⅝
Same Pref.	30	..
Federal Paperboard	45½	38⅞
Same Pref.	21⅜	21¼
Fibre Paper Board	39⅞	44¾
Great Northern	42⅛	43
Hammermill	30	27¾
International	116	107½
Same Pref.	89½	* 89-92
Kimberly-Clark	69⅜	68½
KVP-Sutherland	27½	27⅜
McAndrews & Forbes	27¼	28½
Masonite	32	32
Mead Corp.	40⅛	40⅜
Same Pref.	86⅜	86⅛
Minn. & Ont.	30	29½
Oxford Paper	27¼	28¼
Same Pref.	..	88
Rayonier	20½	20¼
Riegel Paper	35	34½
St. Regis	43¼	40
Same Pref.	91	* 88⅛-90⅝
Scott	81½	76⅞
Same $4 Pref.	..	86
Same $3.40 Pref.	74½	* 72-78
Sealright	35¼	34⅞
Standard Packaging	28⅛	27½
Same $1.60 Pref.	87	* 78½-94
Same $1.20 Pref.	32¾	31¼
Same 6% Pref.	31½	..
Union Bag-Camp	37¾	36½
United Bd & Cart	25	* 22⅛-22⅝
U. S. Gypsum	100½	96½
Same Pref.	152	*148½-151
West Va. P & P	40⅝	40
Same Pref.	94	* 93½-95

New York Stock Exchange — Bonds

Champion P & F 4½%	108½	106½
Champion P & F 3¾%	88¼	85
Kimberly-Clark 3%	..	..
Oxford 4¾%	102⅛	104
Scott 3%	107½	102

American Stock Exchange — Stocks

American Writing	31	30½
Allied Paper	14⅜	13⅛
Brown Co.	14	14⅜
Puget Sound P & T	23½	23⅜

*Closing Bid and Asked Prices.

NASH

Paper Mill Vacuum Pumps Designed for Every Desirable Quality, and the First of these is

DEPENDABILITY

When just 3 days lost production on a paper machine can cost more than the vacuum pumps, dependability is the vital factor in pump selection.

Nash Vacuum Pumps are dependable because they are built big enough and heavy enough to stand the pounding of around the clock production, day in and day out. They are reliable because they have only one moving part, and that rotating without wearing metallic contact. They are reliable because the heavy duty ball bearings are located outside the pump casing where they are accessible. They are reliable because they operate at the low speeds necessary for long life and reliable operation.

Nash Vacuum Pumps have been proving their ability to insure uninterrupted production in leading paper mills for nearly a half century. Install them and be safe.

The new Nash 5308-A shown above, has four separate suction inlets, each of which functions independently of the others. This offers the machine operator great flexibility, since these may be used in any desired combination to produce a variety of capacities and vacuums.

NASH ENGINEERING CO.

South Norwalk, Connecticut, U.S.A.

Jones Pulpers

PICKED FOR PERFORMANCE IN THE NATION'S NEWEST MILLS

Canadian Associates:
The Alexander Fleck Ltd.
75 Spencer St., Ottawa

E. D. JONES CORP. · PITTSFIELD, MASS. · member BELOIT group

Jones

PULP MILL EQUIPMENT AND STOCK PREPARATION MACHINERY

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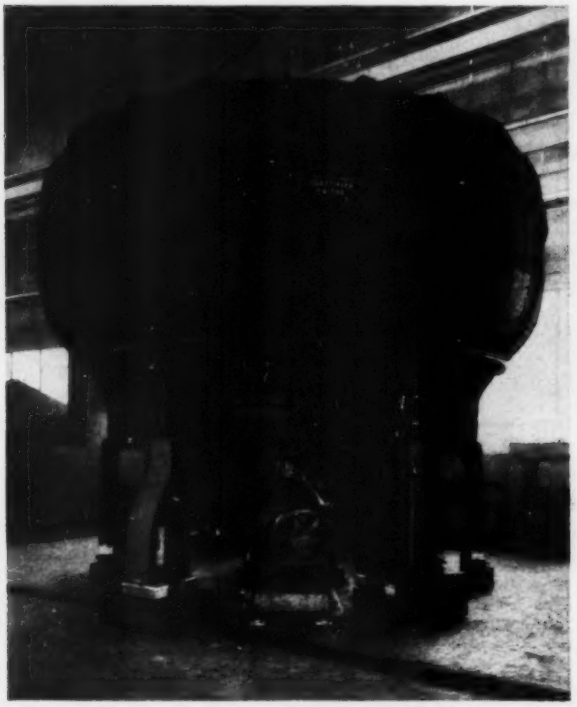
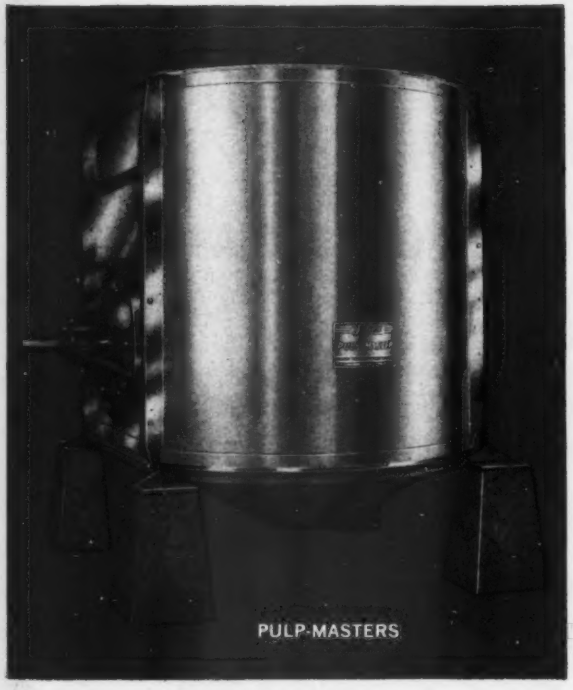
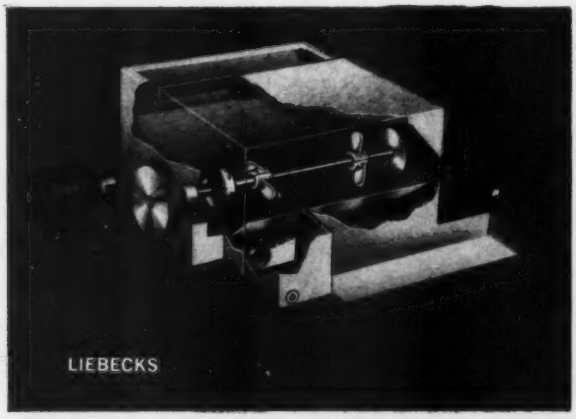
HI-LO PULPERS

TURBOFLEX — Latest addition to the line . . . proven by Fleck in mills throughout Canada and Europe . . . now built in the United States by Jones.





PULP-MASTERS



LIEBECKS

From coast to coast the managers of the country's most modern mills have chosen Jones equipment to handle their pulping needs — from initial slushing and defibering to broke repulping. Their reasons — *dependability, minimum downtime,* and the knowledge that Jones offers a *complete line* of pulping equipment. If you are thinking of modernizing, it will pay you to include Jones in your plans.

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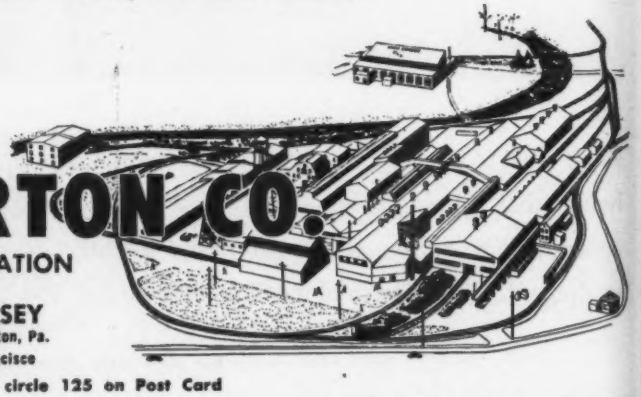
TISCO®

PULP WOOD CONVEYOR CHAIN

Users of TISCO Pulp Wood Conveyor Chain, referring to its outstanding performance say, "The more you abuse it, the tougher it gets." This is hardly an exaggeration. The chain is made of TISCO manganese steel. Under sufficient impact, its hardness may be increased from the original 190 BHN to more than 450. Discover for yourself the lower operating costs resulting from the durability and dependability of TISCO Pulp Wood Conveyor Chain. Contact:



TAYLOR-WHARTON CO.

DIVISION OF HARSCO CORPORATION

Established 1742

HIGH BRIDGE 5, NEW JERSEY

PLANTS: Cincinnati, O. — Birmingham, Ala. — Easton, Pa.

SALES OFFICES: New York — Chicago — San Francisco

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NEWS of the INDUSTRY

Huyck Develops New Fourdrinier Screen

After seven years of intensive research and development, the Formex Co. (a division of Huyck Corp.) has developed a new fourdrinier screen made of synthetic materials which can replace the traditional bronze wire used on the machine.

The new product will be manufactured under Huyck's U. S. Patent No. 2,903,021 and marketed under the tradename "Formex".

Charles A. Lee, general manager of Formex stated: "The fabric will offer many operating advantages over the traditional metallic wire. Manufactured endless, there is no seam to fill up or hang up on suction boxes. Extremely light in weight and completely flexible in all directions, it is not subject to damage as a result of wrinkling or creasing during installation or shipping. It is resistant to corrosion in both high and low pH conditions. Successful commercial trials prove substantial life increase over a conventional metallic fourdrinier wire.

Lee also stated that the rate of introduction of Formex will be slow. The fabric is highly engineered, requiring great precision in manufacture. At least through 1960, the fabric consequently will not be offered for sale generally, but will be sold rather on a limited basis to permit a sound engineering approach and optimal performance for each machine clothed.

Buckeye Finds New Information on Insoluble Particles in Cellulosic Solutions

With the use of an electronic counter, Dr. Lawrence R. Parks and Karl A. Jurbergs of Buckeye Cellulose Corp., have developed new information on insoluble particles in cellulosic solutions. They have found that most insoluble particles are smaller than has previously been believed. The majority of insoluble particles are less than 15 microns in size—not

Texaco Helps to Solve Paper Mill Lubrication Problems

A new laboratory testing device which simulates the severe lubricating conditions on a paper mill machine has just been put into operation at Texaco Inc.'s Research Center located at Beacon, N. Y.

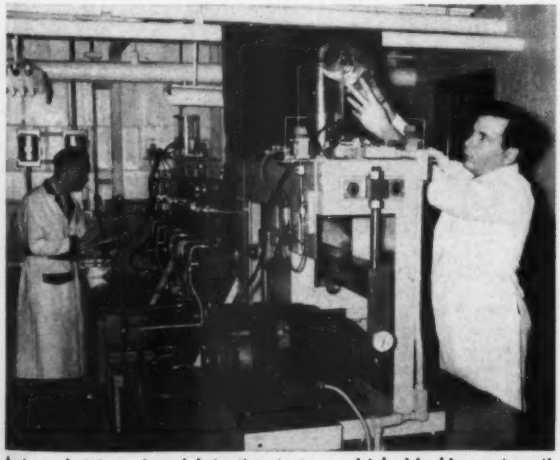
The new testing tool should greatly facilitate the study of the old and the development of new lubrication conditions in the paper industry.

Paper machines have always posed a tough problem for the oil industry, since their bearings not only turn at high speeds under multi-ton loads, but are also exposed to the hot, wet steam that fill the giant, hollow rolls used in drying paper.

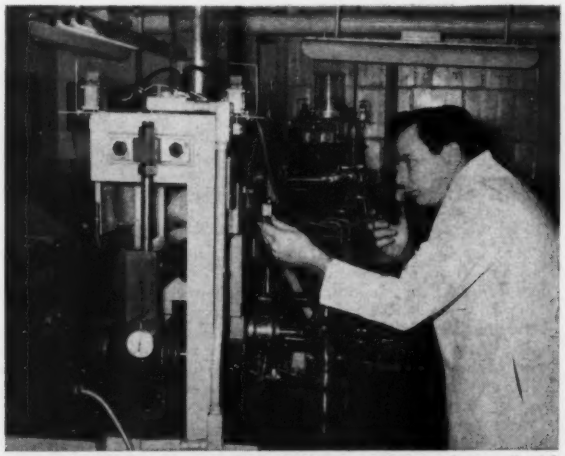
The laboratory machine accurately simulates these conditions by first heating the bearings from within and then feeding condensed steam into its own lubricating system. It can place pressures and speeds on the bearings that even exceed those of the full-size machine.

Because of the steadily growing market for paper, greater demands have been placed upon the machines —forcing them to run longer and at greater speeds. For these reasons the need to acquire better and more durable lubricants has become increasingly important to the paper industry.

This test unit was designed and built by the University of Maine under a contract from Texaco Inc. L. C. Kemp Jr., vice president in charge of the company's research and technical department, stated that Texaco's sponsorship of the new test machine design program was brought about through the company's continuing interest in the paper mill field, where it now supplies a substantial part of the oil for circulating lubrication systems.



Lab technician gives lubrication tester a drink. Machine automatically mixes water into its lubrication system to help simulate the oil contamination problems on paper mill machines.



Lab technician gives oil-testing machine a "shot in the arm" with a hypodermic needle to demonstrate how machine mixes water into its circulation system during critical lubrication test.

more than 15 microns as once thought by most cellulose chemists.

The findings suggest that further research will enable manufacturers to produce improved products such as stronger yarns or clearer films. They also bear out the belief that particle concentration is related to the pulp, the process by which the derivative is prepared, and the filter material through which it is passed. In addition to the particle number, it was found that there are other critical but undetermined properties of the particles.

Royalty-Free Use of A.S.T. Offered

The Atomized Suspension Technique has been offered, royalty-free, to Canadian municipalities by Resources Minister, Hamilton.

In making this announcement, Hamilton stated: "For many years now, Canada's pulp and paper industry, McGill University and the Government of Canada have carried on valuable research through the institute in order to support the world competitive position of Canada's prime industry. I am grateful that the directors of the institute should have unanimously agreed that any government in Canada—be it municipal, provincial or federal—should receive the royalty-free use of this new technique for sewage disposal in recognition of the federal government's practical support of research in the institute".

This new scientific method of sewage disposal was developed and patented by the Pulp and Paper Research Institute of Canada.

U. S. Forest Products Laboratory to Celebrate Golden Anniversary

The staff of the U. S. Forest Products Laboratory will observe its Golden Anniversary June 2 through June 4 at Madison, Wis., where the institution was founded 50 years ago.

Edward G. Locke, director, announced that virtually all the forest products industries, as well as education, science and government would be represented by speakers or participants in other events.

"Forest Products—the Next Fifty Years" will be the theme stressed by four top industry executives who will describe how research has been applied to his field. F. K. Weyerhaeuser, board chairman of the Weyerhaeuser Co., will represent the lumber industry. H. E. Whitaker, board chairman of the Mead Corp., Dayton, Ohio, and president of APPA, will speak for the paper industry. The plywood industry will be represented by W. E. Difford, managing director of the Douglas Fir Plywood Association. The chemical industry will be represented by Samuel W. Lenher, vice president and adviser for research of E. I. duPont de Nemours & Co.

42 Members Receive Degrees in Applied Felt Technology

On April 1, the Huyck Felt Co. presented degrees in applied felt technology to 42 members who recently attended the company's Felt Workshop. The class (No. 17) was held from March 30 through April 1 in Rensselaer, N.Y.

This class was the first in a series of four to be held in 1960. Other classes are from: May 18-20 (No. 18); June 22-24 (No. 19); and September 14-16 (No. 19).

Changes in format, subject matter and programming have been made for the courses this year. This was done in accordance with suggestions offered by the alumni. The changes allow opportunity for the discussion of individual problems and subjects of special interest. The balance between practical and technical material has also been altered to provide more information of value to all operating papermakers.

A few of the subjects covered in a typical workshop program are: A Mill Tour; Felt Design Characteristics; What Quality Control Means to You; New Felt Developments; Discussion—How Singeing, Napping, Size Changes, and Other Design Variables Affect Felt Performance; Discussion of Importance of Chemical Felt Treatments; Discussion of Felt Cleaning and the Effects of Chemicals on Felts; Checking and Improving Machine Efficiency; Practical Measurements of Felt Performance; Small Group Discussions Based on Common Machine Interest; and Discussion of Paper Machine Experiences.

Pictured here, are the men who have attended Huyck Felt Workshop No. 17 and have received their degree in applied felt technology. Seated left to right are: **J. F. Gleason**, Johns-Manville Products Corp.; **William Ernst**, Scott Paper Co.; **Edmond S. Spencer**, Eastman Kodak Co.; **Pete Howard**, Champion Paper & Fibre Co.; **John Graham**, Kimberly-Clark Corp.; **Milton Markman**, Peter J. Schweitzer Div.; **Ed Hanna**, Personal Products Corp.; **Charles DiGrigoli**, Hurlbut Paper Co.; **Robert Cameron**, Chemical Fine Paper & Board Div.; **Slyvester Chmiel**, Chemical Fine Paper & Board Div.; **Samuel D. Costanzo**, Federal Paper Board Co. Inc.; **Charles Griffin**, Kimberly-Clark Corp.; **James Rumsey**, Fleming & Son; **Fonzo Man**, Champion Paper & Fibre Co.; **Joseph Joynt**, St. Regis Paper Co.; **Conrad C. Hammann**, Valley Board Corp.; **Albert Oetken**, International Paper Co.; **George Pickett**, Mohawk Paper Mills; **M. O. Morris**, Bloomer Brothers Co. Standing left to right are: **Arthur S. Hayeslip**, Huyck Corp.; **Ralph H. Beaumont**, Huyck Corp.; **Irving H. Peters**, Huyck Corp.; **Raymond G. Keim**, Huyck Corp.; **Thomas M. Alexander**, Huyck Corp.; **Paul G. Mansuy**, Huyck Corp.; **C. Otto Berggren**, Huyck Corp.; **Kenneth Waltman**, Scott Paper Co.; **Hugh Nicolson**, National Vulcanized Fibre Co.; **Bill Kane**, Kimberly-Clark Corp.; **Carl Krenkel**, Kimberly-Clark Corp.; **David R. Hargrave**, Kimberly-Clark Corp.; **Wayne Arey**, S. D. Warren Co.; **Frederic A. Soderberg**, Huyck Corp.; **Warren C. Naugler**, Huyck Corp.; **John D. Skeer**, Huyck Corp.; **Alan R. Boyd**, Huyck Corp.; **Wilhelm Moe**, Huyck Corp.; **Earl D. Rhodes**, Huyck Corp. Graduates not pictured due to earlier departure are: **Lester Tarbell**, Bird & Son Inc.; **Louis Fossarelli**, Continental Can Co.; **Dr. A. W. J. Dyck**, Paper Industry; and **Warren G. Printz**, Manchester Machine Works.

*Submitted by Edward J. Boarini, The Celotex Corporation, 120 So. LaSalle St., Chicago 3, Ill.

Photo by Harold M. Lambert, Philadelphia, Pa.

HAM FELTZ says:

"Reminds me of HAMILTON Felts . . . they open new avenues for profits, too!"

"Like the St. Lawrence Seaway,
Hamilton Felts are ultra efficient
in engineered water removal.
They do not shed water
but run it like a sieve.
Hamilton Felts are also pre-shrunk,
'broken-in,' for the machine
on which you intend to use them.
This too—gives you operational savings.
Results for you: less downtime,
more tonnage, more profits."

If one of our present 300 proven styles won't solve your specific problem, we will be happy to design a Hamilton Felt that will. Just ask your Hamilton Felt Service Salesman.

*WIN . . . *A NEW Shakespeare Spincast Fishing Outfit!*

YOU CAN'T BEAT
Hamilton
FELTS

"What famous place reminds you of Hamilton Felts? Tell us why in a few words; sign your name and address and name of company. Each month, the idea from a papermaker that we use wins a new 1960 model Shakespeare Spincast Rod and Reel—FREE! When identical winning ideas are submitted by 2 or more papermakers, the one with the earliest postmark will be considered the winner. *Every U.S. papermaker entrant* receives a famous Rex Spoon fishing lure—FREE. Send me your suggestion—today. Ham Feltz, 612 First National Bank Bldg., Cincinnati 2, Ohio."

SHULER & BENNINGHOFEN, HAMILTON, OHIO

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NPTA Open Imagineering Contest

The National Paper Trade Association has opened an Imagineering Contest for Paper and Printing to all its merchant members and their staffs. This contest will uncover unique and unusual uses of printing which can be promoted nationally.

The association feels that there are many obscure uses of printing and also undeveloped possibilities for entirely new printing applications that could be promoted into widespread demand at the national level.

Any member wishing to receive additional entry blanks for the contest can write to: Imagineering Contest Department, National Paper Trade Association, 220 East 42nd St., New York 17, N. Y.

Symposium on Forest Biology to Be Held

A three-day special Symposium on Forest Biology will be held August 24 through 26 at the New Washington Hotel in Seattle, Wash.

The program is being sponsored by the Forest Biology Committee of TAPPI and is designed to attract both woodlands men and mill people interested in wood quality. Special sessions will be devoted to discussion of problems shared by both mill men and foresters.

Expected attendance at this program will be limited by the available facilities to approximately 200. Therefore, it is required that registrations be made in advance of the opening date. Pre-registration forms are available from TAPPI, 360 Lexington Ave., New York 17, New York.

Grant Received to Support Research on Wetting of Solids by Liquids

A grant of $39,300 from the National Science Foundation has been received by Lehigh University for the support of basic research entitled Wetting of Solids by Liquids.

Dr. Albert C. Zettlemoyer, professor of chemistry, will direct the three-year project and will be assisted by Dr. John J. Chessick, research assistant professor of chemistry.

The project aims to develop fundamental information concerning interaction of surfaces with molecules, to rate polarity of solid surfaces and to measure energy distribution.

Ninth Pulp & Paper Statistics Course

The ninth pulp and paper statistics course will be held August 8 through 19 at Brevard College in Brevard, N. C.

Two courses of instruction, one basic and one advanced, will be held concurrently during the two-week period. They will be concerned with the techniques of a statistical analysis in research, control and management methods in the pulp and paper industry.

Further information and application forms for the course may be obtained from the Institute of Statistics, North Carolina State College, Raleigh, N. C.

The course is jointly sponsored by the Institute of Statistics of North Carolina State College, the Technical section of the Canadian Pulp & Paper Association and the Technical Association of the Pulp & Paper Industry.

New Scented Polyethylene Film

Allied Chemical Corp. introduced a number of new developments in packaging at the 29th AMA National Packaging Exposition in April.

Scented polyethylene film, a quick-breaking aerosol foam, an improved polyester foam process, FDA-certified colors and dyes for food packaging were among the new ideas shown by the company.

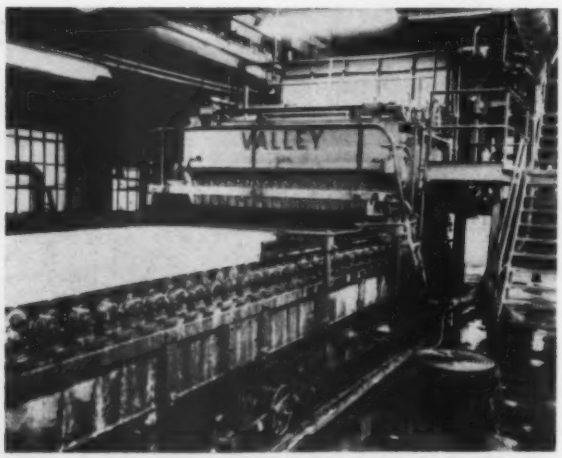
Upson Celebrates 50th Anniversary

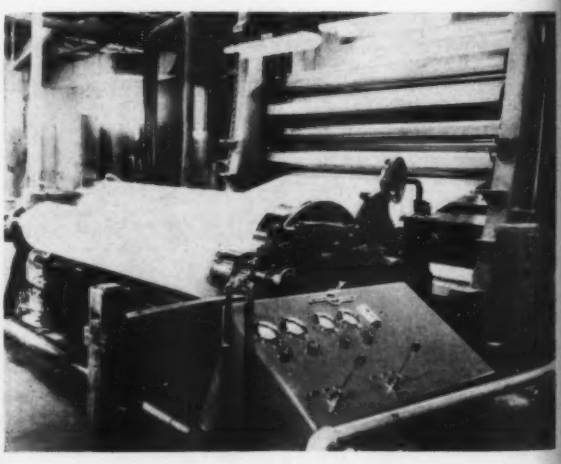
The span of years between 1910 and 1960 constitutes a golden era for the Upson Co. of Lockport, N.Y.

A golden anniversary program of accelerated activities and promotions has been inaugurated by the company for this year.

In July of 1910, the company was organized by W. H. Upson Jr. and his brother, Charles A. Upson, and was incorporated on the following October 20. With its modest beginnings in three small buildings containing 16,000 sq. ft. of floor space, the Upson plant in Lockport today is spread over 23 acres on which there are 50 buildings with over 300,000 sq. ft. of floor space.

Recent Expansions in the Industry

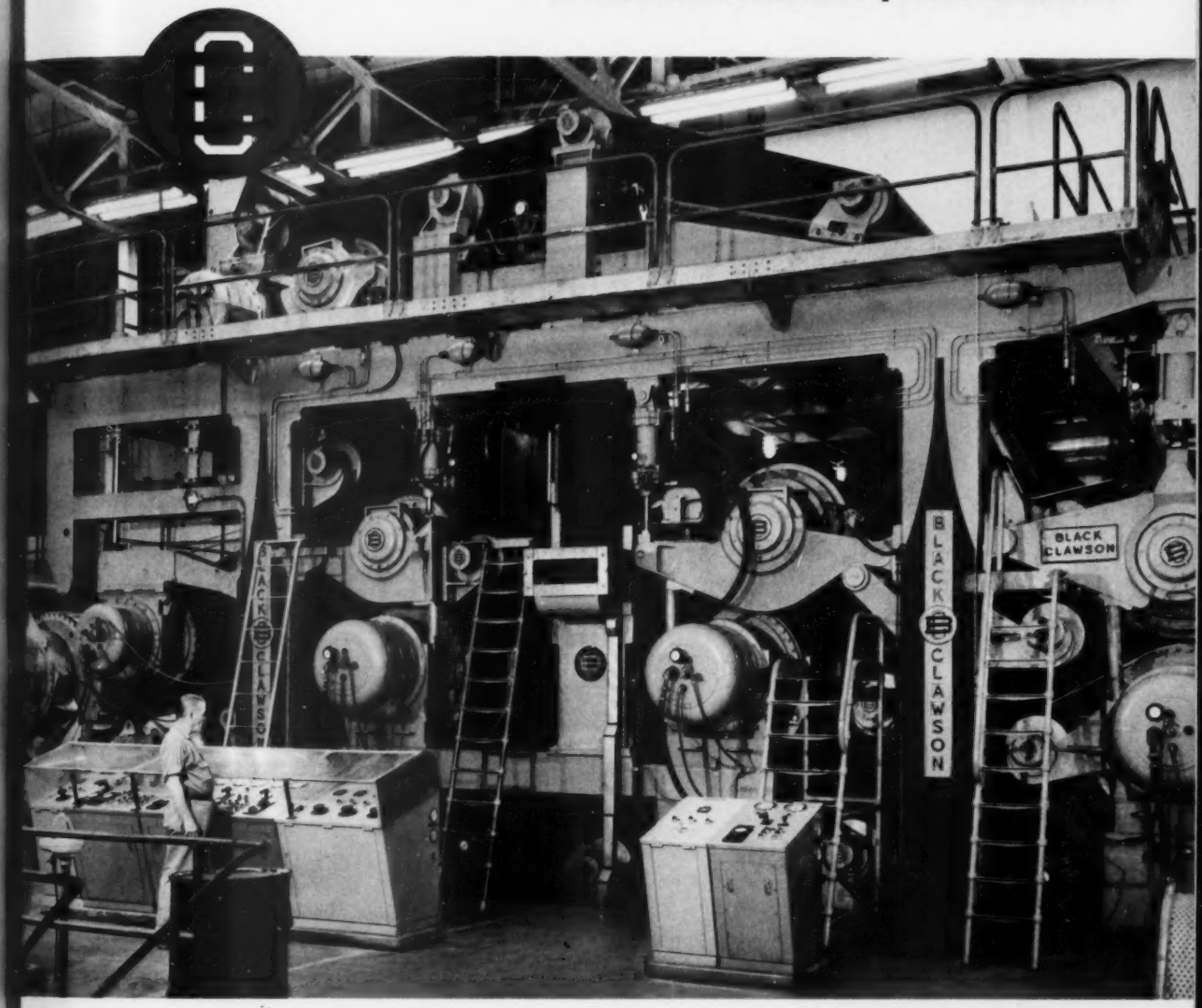




Chase Bag Co. Installs two New Units

This head box, pictured above (left), has been installed at Chase Bag Co.'s paper mill in Chagrin Falls, Ohio. The head box enables Chase to improve quality and speed production of specialty kraft industrial papers. The unit was manufactured by Valley Iron Works at a cost of $80,000 before installation. Pictured at the right is a new improved automatic rewind reel on one of the larger paper machines at Chase Bag which was also installed to improve production efficiency. This reel was purchased at a cost of $35,000 from Beloit Iron Works.

Have You Ever Seen *a cleaner,*
more business-like press section?



It's cleaner in design, uncluttered, easier to operate and maintain because it's been simplified. There's a minimum of parts. Roll removal is an easy procedure . . . so is felting, because all components are accessible.

When engineering paper machine sections, Black-Clawson strives for greater efficiency through design simplification.

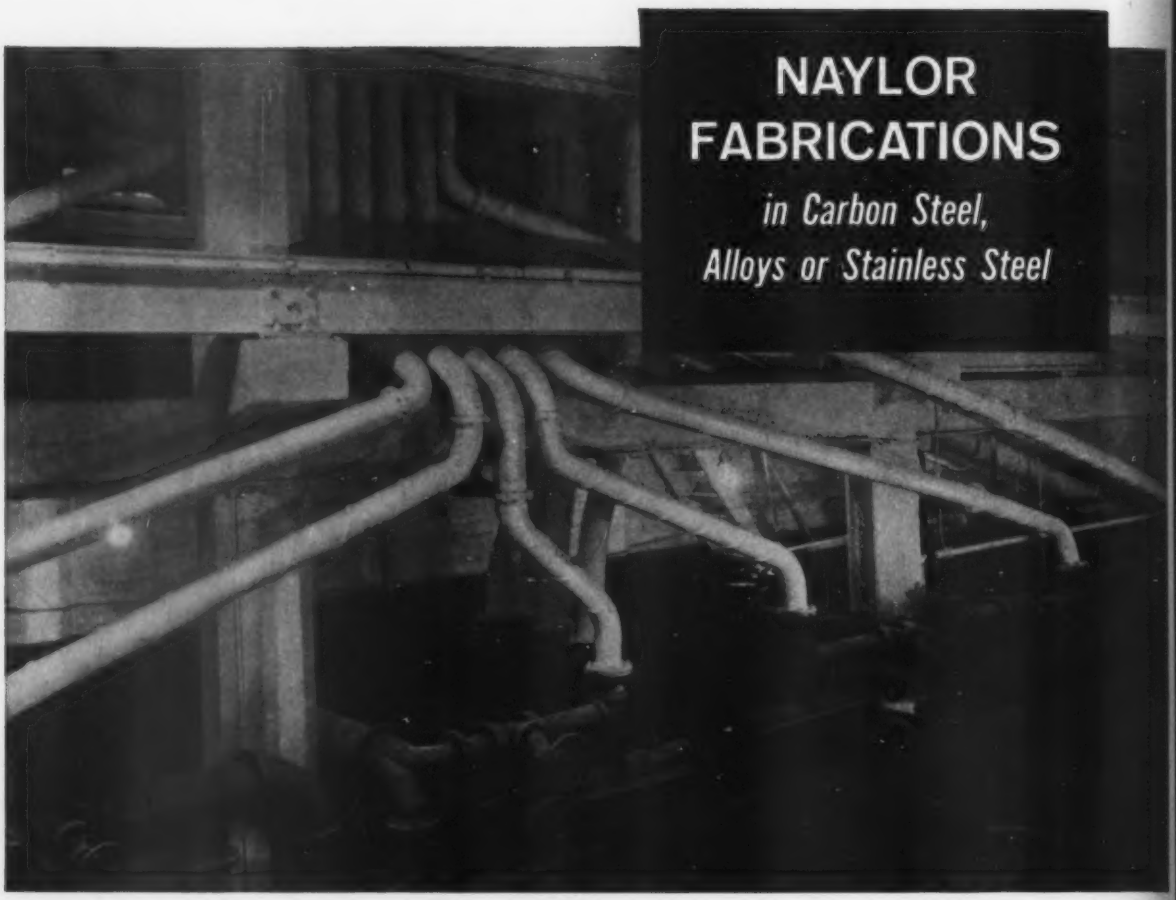
The customer is always the beneficiary of advanced paper machine engineering that is based on practical understanding of the papermaker's needs.

The Black-Clawson Company
Paper Machine Division, Watertown, N. Y.

Another Advanced
Engineering Design

BLACK-CLAWSON

FITS YOUR PIPING PICTURE...



For pipe, fittings or special piping fabrications, look to NAYLOR fabrication service. Here is a dependable source for close-tolerance production to your most exacting specifications—from carbon steel, alloys or stainless steel.

NAYLOR pipe sizes range from 4″ to 30″ in diameter and wall thickness from 14 to 8 gauge.

Special piping fabrications from 3″ to 44″ in diameter and wall thickness up to 3/8″.

Standard fittings are available from stock.

Write for Bulletin No. 59 or send specifications for quotation.

NAYLOR PIPE *Company*

1233 East 92nd Street, Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 60 East 42nd Street, New York 17, N. Y.

For more data circle 128 on Post Card

News of the Industry . . .

Black-Clawson Equipment Featured at U.S. Gypsum's Florida Mill

Black-Clawson Co. has been awarded the manufacturing contract for all of the major production equipment for U. S. Gypsum Co.'s new paper mill in Jacksonville, Fla.

A 156-in. wide, nine-cylinder paperboard machine for producing 150 tons per 24 hrs., is the principal piece of equipment. It will be equipped with a suction return drum press, four primary presses, plain first main press and suction second main press. Following the double-decked dryer section will be twin calender stacks, a Black-Clawson Autoflyte reel and Rollflyte slitter-winder. This unit is being built at B-C's paper machine division at Watertown, N.Y.

At the Shartle Division of B-C, equipment is being constructed for the three stock preparation systems that will deliver all of the filler, back liner, and top liner stock required by the paperboard machine. The three systems employ Hydrapulpers, Liquid Cyclones, Sutherland Breaker Traps, Brammer consistency regulators, Black-Clawson jordans and thickeners, Selectifier screens, and Black-Clawson pumps and valves.

U. S. Gypsum plans to complete the mill and begin operations early in 1961. The mill will produce a range of paper grades for the company's entire line of gypsum board products.

Bowater-Scott Forms Second Company in Europe

A new company to be known as Burgo Bowater Scott S.p.A. was formed April 7 by Bowater-Scott Corp. Ltd. of England.

The new company was established in Turin, Italy, and will be jointly owned by Cartiere Burgo S.p.A., a leading Italian paper manufacturer, and Bowater-Scott.

For the present the company will convert large "parent" rolls, imported from the Bowater-Scott plant at Northfleet, England, into sanitary paper products such as facial and toilet tissues, paper towels and napkins. Future plans will require installation of a modern high-speed paper machine to produce its own parent rolls of tissue.

Hercules Forms Subsidiary in Sweden

Hercules Powder Co. has announced the formation of a wholly owned subsidiary in Sweden. A plant will be built and operated for the production of chemicals for the paper industry. Headquarters for the company, which will be known as Hercules Kemiska Aktiebolog, will be in Gothenburg. Location of the plant has not yet been established.

Union Carbide Revises Plant

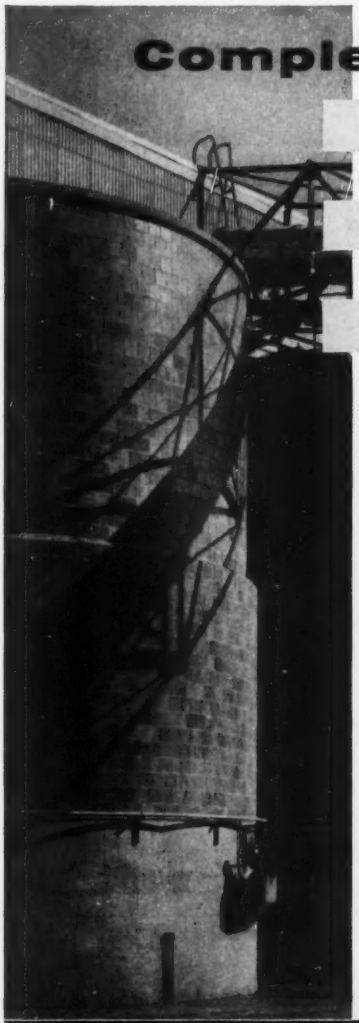
Union Carbide Chemicals Co. has made plans to alter and revise the plant facilities at Brownsville, Texas.

The plant will be Carbide's eight producing center for a line of more than 400 chemicals for industrial and consumer use. Among the chemicals to be made are: acetic acid, acetic anhydride and methyl ethyl ketone.

Mexican Plant Starts Production on New Continuous Straw Pulp Mill

Empaques de Carton Titan, S. A. in Monterrey, Mexico has reported a successful start-up of its new 60-ton (metric) per day Pandia continuous pulp mill. The plant is producing unbleached pulp from wheat straw for corrugating medium.

The Pandia continuous digester installed at the plant was built by Black-Clawson Co. It consists of two 42-in. digester tubes complete with Pandia



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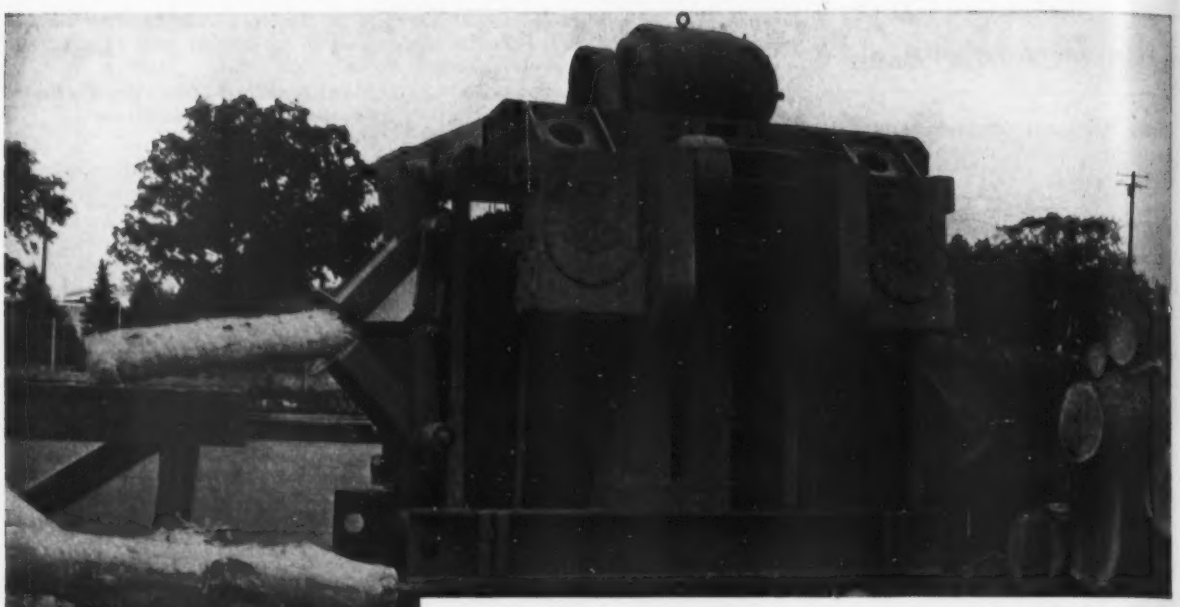

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THE IMPCO S20-5 BARKER FOR HARDWOOD OR SOFTWOOD FROZEN OR CROOKED!

The S20-5 delivers a dependable high annual production rate of cleanly barked logs at very low maintenance and operating costs. This dependability, due to its extra-rugged design, is maintained with frozen crooked hardwood. Present installations average 250 cords/day with reported maintenance costs of 3 to 4 cents/cord, on logs in the 3″ to 19″ diameter range, down to 5′ in length.

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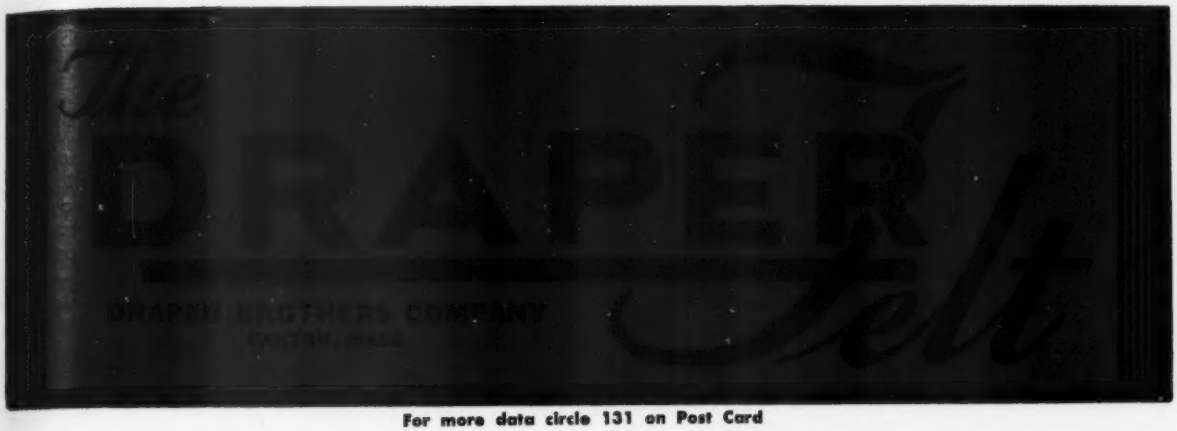

For more data circle 131 on Post Card

News of the Industry . . .

discharger, chemical supply pump, drives and live bottom blow tank.

Western Kraft Finishes New Lab

Western Kraft Corp. has completed its new $100,000 laboratory project at Albany, Ore.

The new lab was designed to test and develop new and improved packaging as well as pulping and papermaking processes. The latest box equipment will be utilized. Experimental pulping and papermaking equipment will be installed at a later date.

Felix Hammack, formerly assistant technical director at the Crosset Paper Mills, has been named as technical director in charge of the laboratory operations.

International Installs Unwind-Splicer

International Paper Co. has recently installed a new unwind and automatic splicer at its mill in Moss Point, Miss.

The unit, which was supplied by the Waldron-Hartig Division of the Midland-Ross Corp., feeds paper up to 152 in. wide to off-machine coating equipment. It is built to handle rolls measuring up to 5 ft. in diameter and weighing up to 7 tons. Although now running at speeds up to 1000 fpm, it is designed for future operation at 2000 fpm. It is operated by one man who controls unwinder and splicer operations from a push-button control panel.

FMC Opens Inorganic Application Lab

Full scale testing facilities for chemicals used in textile, pulp and paper, and other applications are now in operation in Food Machinery & Chemical Corp.'s Chemical Research & Development Center at Princeton, N. J.

Fibreboard Forms New Division

Fibreboard Paper Products Corp. of San Francisco, Calif., has announced the formation of a completely new manufacturing and merchandising unit to be known as the Tube and Can Division.

William H. Ecker, who has been named as general manager of the division stated: "This division has been established as a separate packaging division to provide greater emphasis for Fibreboard leadership in this important packaging field".

Beloit Designs New Machine for Tasman

A second newsprint machine has been ordered for the Tasman Pulp & Paper Co. Ltd. mill at Kawerau, New Zealand.

The new machine will be designed by Beloit Iron Works of Wisconsin, and built by Walmsleys (Bury) Ltd. of Bury, Lancashire. Designed to run at a speed of more than 2,500 fpm, the unit is said to be the most modern in the world. It will increase the mill's total production to 180,000 tons of newsprint a year.

Scott to Construct Research Center

Scott Paper Co. has awarded a general contract for the construction of its new research center to be erected in Delaware County, adjacent to the Philadelphia International Airport.

The new Center will provide 152,000 sq. ft. of space for the company's research and engineering personnel. Occupancy is expected in May 1961.

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FOR ALL PAPER MAKING PURPOSES

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(Formerly: English China Clays Sales Corporation)
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For more data circle 132 on Post Card

News of the Industry . . .

Corporate Changes

Sveen-Pedersen Sales Corp., formerly at 24-36 Jackson Ave., Long Island City, N. Y., has been purchased by the E. D. Jones Corp. and is now located in Pittsfield, Mass.

American Paper Products Co. of Philadelphia, Pa., recently purchased virtually all capital stock of the Ajax Paper Tube Co. of Cleveland, Ohio. The acquired plant will be operated as a subsidiary with its existing management and organization.

Jacob L. Barowsky, president and founder of the **Adell Chemical Co. Inc.**, has announced that he has signed an agreement to sell the Holyoke, Mass., firm which makes Lestoil liquid detergents and Lestare dry bleach to the **Standard International Corp.** of Andover, Mass. Included in the agreement are: Adell Chemical Co. Inc., the parent company; Lestoil Inc.; Lestoil Ltd. of Canada; Jackson Associates, the advertising agency of the company; and the JLB Realty Trust. The sale price was not disclosed.

Flintkote Co. has entered into a formal agreement for the acquisition of **Harry T. Campbell Sons' Corp.** of Baltimore, Md. The pooling of interests agreement contemplates that the Campbell company and its subsidiaries will continue to be operated in the present corporate forms and with no change in the management or personnel.

Stockholders of **Federal Paper Board Co. Inc.** and **Manchester Board & Paper Co. Inc.** of Richmond, Va., have approved a merger of the two concerns. The southern company will continue under its present management as the Manchester Board & Paper Division of Federal.

Randolph Paper Box Co., a division of Albemarle Paper Mfg. Co. has purchased the folding box business of **Consolidated Paper & Box Mfg. Co. Inc.** This is the third major acquisition by Albemarle in the Richmond area within the past twelve months. Randolph Paper Box Corp. was acquired in April, 1959, and Richmond Container Corp. was acquired in September of 1959.

Papercraft Corp. has announced the multi-million dollar purchase of the physical assets in the United States of the **LePage's division of Johnson & Johnson.** Assets include the large plant facilities on its own 62-acre site. It will be operated as a division of Papercraft through its own network of sales executives and field representatives. Sales headquarters will be in Pittsburgh.

Hercules Powder Co. and **A. C. Hatrick, Pty., Ltd.**, an Autralian company, have negotiated an agreement under which they will organize a new jointly owned Australian company. It will be known as **Hercules Powder Co. (Australia) Pty., Ltd.** The new company will provide rosin derivatives and other industrial chemicals for sale in Australia and New Zealand. Headquarters will be in Springvale (Melbourne), Victoria.

St. Regis Paper Co. has continued to expand its production field by the acquisition of the **Howard Paper Mills** of Dayton, Ohio, and the **Central Waxed Paper Co.** of Chicago, through exchanges of stock. The two companies had sales last

MURCO Finishing Room Equipment

WRITE for complete information on equipment illustrated here . . . and details to enable us to furnish complete proposals and quotations.

TRANSFER PAPER ROLLS
EASILY • SAFELY • ECONOMICALLY

MURCO ROLL LOWERING TABLE

MURCO Hydraulic Roll Lowering Table does away with complicated, expensive Recessed Elevators or cumbersome overhead hoist arrangements. Transfer of the finished roll is a simple and safe operation . . . prevents paper roll damage . . . no bending or breaking winder shafts. Compact . . . occupies small floor space . . . rigid construction positively prevents movement when table is loaded. Made in sizes practical for any normal size paper roll. In the "well", a part of the Roll Lowering Table, you have a spare Windershaft always ready for use.

IF YOU SHIP PAPER IN ROLLS

MURCO ROLL HEADING MACHINE

- **WILL CUT FINISHING ROOM COSTS**
- **PRODUCE NEATER ROLLS**
- **IMPROVE ROLL APPEARANCE**
  - **Valve may be operated from any position**
  - **Rollers of solid aluminum or wood**
  - **Heavy frame construction that requires no maintenance**

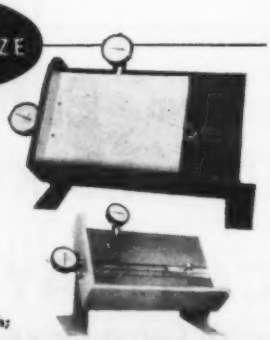
Here is a machine that will operate efficiently and continuously day-in-and-day-out without any attention that is so common with roll heading machines of lighter construction. The pioneer Roll Heading Machine in the industry, MURCO Roll Heading Machines are made in various sizes — 24" to 72" diameter and lengths varying up to 200". Installations in mills throughout the country.

TO MAKE SURE YOUR PAPER IS TRUE IN SIZE

MURCO PAPER SIZE GAUGE

CHECK 3 WAYS

- **WIDTH**
- **LENGTH**
- **SQUARE**



The size illustrated is used for checking 8-½" x 11" sheets in ream quantities. Gauge is adjustable from 7-½" minimum to 15" maximum on length, but gauge larger or smaller to meet operator's convenience can be furnished. When accurately cut paper is inserted the dial indicator reads zero in both positions. Any cut that is off size, either on the width or out of square will immediately register plus or minus on the dial indicator. Machined and precision ground, overall dimensions of unit illustrated are 18" long; 10" deep; 12" high; checking tables incline to 45°.

MURCO

D. J. MURRAY MANUFACTURING CO.
Manufacturers Since 1883 WAUSAU, WISCONSIN

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year of $17,000,000 and $9,000,000 respectively, and the value of St. Regis stock given in return for the Howard mills would be over $13,000,000. The Howard company produces fine papers and Central Waxed produces a line of flexible packaging materials.

Inland Container Co. which has a half interest in a projected $23,000,000 kraft mill in Georgia, has made a public offering of 175,000 shares of its stock at $38. **Mead Corp.** is Inland's associate in the enterprise.

Nopco Chemical Co. has announced that its wholly-owned subsidiary, **Nopco Chimie, S. A.** at Fribourg, Switzerland, has acquired a half interest in the French chemical firm, **Doittau-Sopura, S. A.** at Corbeil-Essonnes, outside Paris. Doittau-Sopura will produce the complete line of Nopco chemicals for distribution in the European Common Market area.

Standard Packaging Corp. has issued a new six per cent preferred stock as part of its acquisition of **Brown & Bigelow,** novelty manufacturers.

Coming Events

TAPPI

May 23-25 — 11th Annual Coating Conference, Edgewater Beach Hotel, Chicago, Ill.

June 14-16 — Pulp Bleaching Conference, Edgewater Beach Hotel, Chicago, Ill.

August 22-24 — 14th Alkaline Pulping Conference, Multnomah Hotel, Portland, Ore.

August 24-26 — Forest Biology Symposium, New Washington Hotel, Seattle, Wash.

September 27-29 — 11th Testing Conference, Pantlind Hotel, Grand Rapids, Mich.

October 10-13 — 10th Corrugated Containers Conference, Royal York Hotel, Toronto, Canada.

October 23-27 — 15th Engineering Conference, Robert Meyer Hotel, Jacksonville, Fla.

PIMA

June 7-9 — National Meeting, St. Francis Hotel, San Francisco, Calif.

June 17 — Miami Valley Division, Piqua Country Club, Piqua, Ohio

September 1-3 — New York-Canadian Division (Fall Meeting), Saranac Inn, Upper Saranac Lake, New York.

September 22-24 — Northeastern Division, Poland Spring House, Poland Spring, Maine.

September 30 — October 1 — Pennsylvania-New Jersey-Delaware Division (Fall Meeting), Pocono Manor Hotel, Pocono Manor, Pennsylvania.

OTHER MEETINGS

May 22-25 — 37th Annual Convention and Merchandise Exhibition of the National Sanitary Supply Association, Fontaine-bleau Hotel, Miami Beach, Fla.

May 23-26 — Annual Design Engineering Show, New York Coliseum, New York.

June 6-8 — Material Handling Institute New England Show, Commonwealth Armory, Boston, Mass.

June 7-8 — Waste Paper Symposium, Conrad Hilton Hotel, Chicago, Ill.

June 9 — Regional meeting, Midwestern Division, National Association of Waste Material Dealers, Conrad Hilton Hotel, Chicago, Ill.

June 15-July 7 — Fifth Industry Seminar conducted by The Institute of Paper Chemistry, Institute of Paper Chemistry, Appleton, Wis.

June 19-22 — American Institute of Chemical Engineers joint meeting with Instituto Mexicano de Ingineros Quimicos, Hotel Del Prado, Mexico City.

July 19-21 — Western Packaging & Materials Handling Exposition, Los Angeles Pan Pacific Auditorium.

August 14-17 — 4th National Heat Transfer Conference and Exhibit, Statler Hotel, Buffalo, N.Y.

August 29-September 10 — Fifth World Forestry Congress, University of Washington, Seattle, Wash.

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NO Hard or Soft Spots at the Winder with . . .
RMF hydroscillators
This simple, compact oscillating unit provides a constant horizontal shifting motion while the sheet is being wound into a roll. This back and forth movement prevents wrinkles from "tracking" and building up throughout the roll. No more wrinkles, no more hard and soft spots!
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Box 846, Dayton, Ohio
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NAMES *in the* NEWS

International Paper Co.

Frank E. Chapman and Harry Farrell have announced their retirement from International. They were employed for 62 years—achieving the longest records of service ever attained by any company employee. Both men joined the company when it was founded in 1898.

Chapman spent many years as mill agent at several different mills of the company. Farrell spent his entire career in the company's New York office.

L. J. Trahan

Changes at Southern Kraft Division

NATCHEZ, MISS.—Jack F. Kilborn, senior research associate in the research department at Mobile, has been named technical director of the company's Natchez mill. He will replace John H. Griffin, who has been transferred to Springhill, La.

C. D. McDonald

J. M. Smith

MOBILE, ALA.—L. J. Trahan has become technical director of the Mobile mill. He was previously quality control supervisor for the same mill.

Joel R. Baker, technical director of the company's Georgetown, S.C., mill, has been transferred to Mobile to serve as production superintendent.

Thomas H. Smith moves from technical director of the Mobile mill, to division assistant coordinator of business papers.

James M. Smith, who has been assistant paper mill superintendent, will move to division assistant coordinator of news and groundwood specialties.

H. Minge Reed Jr. moves to division coordinator of maintenance. He was previously plant engineer at the company's mill in Springhill, La.

B. Hanlon Ingram has been promoted to an assistant group leader in the Mobile research department. He will transfer to Mobile from the company's Natchez, Miss., mill where he was quality control supervisor.

Guy J. Babin, who has been assistant coordinator of business boards at the company's Bastrop, La., mill, will transfer to Mobile to serve as general assistant to the division paper mill coordinator of the Southern Kraft Division.

J. R. Baker

T. H. Smith

GEORGETOWN, S. C.—Charles D. McDonald has been promoted to technical director of the Georgetown mill. He will transfer from the company's mill in Moss Point, Miss., where he has worked since joining the company in 1940.

BASTROP, LA.—Ian Sim, assistant mill manager of the company's mill in Springhill, La., will transfer to the Bastrop mill in the same capacity.

Frank P. Shearer, assistant coordinator of business papers, will become technical director.

George M. Williams has been promoted to paper mill superintendent at Bastrop. He was previously serving as assistant paper mill superintendent at the company's Panama City, Fla., mill.

SPRINGHILL, LA.—John H. Griffin will replace Ian Sim as assistant mill manager of the Springhill mill. He was previously technical director of the Natchez mill.

Richard D. Quina, who has been serving as assistant plant engineer at Mobile, will become plant engineer at Springhill to fill the vacancy created by the transfer of H. Minge Reed Jr.

H. Reed Jr.

F. P. Shearer

I. Sim

J. F. Kilborn

A. E. Staley Mfg. Co.

W. C. Gallager has been promoted to Southern manager for the paper industry sales. He will continue to headquarter in Charlotte, N. C.

Alfred W. Brunlieb has been named new assistant branch manager at Cleveland.

Donald M. Baldwin has been named new assistant branch manager at St. Louis.

Edward B. Freyfogle has been ap-

pointed to succeed A. W. Neureuther as chief engineer for the company. He was previously manager of process service engineering last spring. Neureuther, who has resigned, will become an engineering consultant. He has served A. E. Staley for 26 years, 16 years as chief engineer.

Riegel Paper Corp.

Henry P. Brodnax has been appointed as paper mill superintendent for the company's Carolina division. He will replace B. C. Moore who has resigned his duties with the company.

E. A. Henry will assume Brodnax's former position of assistant paper mill superintendent. He was previously pulp mill superintendent and assistant superintendent (technical).

H. P. Broadnax

G. D. Jernegan

Institute of Paper Chemistry

George D. Jernegan has been named as Dean of Students. He will have responsibility for student housing, summer and permanent employment, guidance and counseling and related activities.

He has been on the staff of the Institute since 1954, and was appointed director of continuing education in 1958, a position he will continue to fill. He is also author of "A Guide to Career Opportunities in the Pulp and Paper Industry".

John W. Bolton & Sons Inc.

Charles E. Ward has been appointed sales representative to serve John W. Bolton & Sons Inc. and the Emerson Mfg. Co. Division. He will call on pulp and paper mills throughout Illinois, Indiana, Kansas and Colorado and will make his headquarters in Chicago.

Crown Zellerbach Corp.

E. W. Erickson, vice president for manufacturing, has retired after 40 years of service to the company. However, he will continue to serve as a consultant.

F. O. Boylon has been elected to succeed Erickson as vice president for manufacturing. Prior to his new position, he was serving as assistant vice president of manufacturing.

Howard C. Hall has been promoted from assistant resident manager to resident manager of C-Z's pulp and paper mill in St. Helens, Ore. He will succeed Raymond A. Dupuis who was recently named resident manager of the Corporation's West Linn, Ore., mill.

Henry H. Gaylord, formerly New York regional sales manager of wraps and bags for the Gaylord division, has been promoted to Northeast regional sales manager with head quarters in New York City.

H. C. Hall

F. O. Boylon

H. H. Gaylord

E. W. Erickson

Carl Magnus Management Consultant

An announcement has been made on the return of Carl Magnus from his extended Oriental tour. He spent 15 months with the UN in Korea and nine weeks in Japan in an industrial-economic study of modern Japan.

Present address is: Nincar Lodge, R.R. #2, Johnson, Vermont. Phone: MElrose 5-7707.

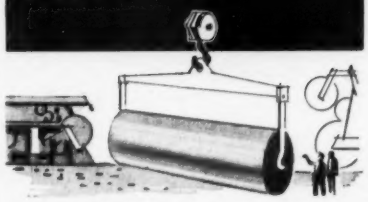
Dow Chemical Co.

Ted W. Palmer has been named product manager. He will be responsible for the sales programing of Separan flocculants and Versene chelating agents. He joined Dow in 1957 and has been a technical salesman of Separan, Versene and Dowex ion exchange resins.

Mead Corp.

C. Greene Garner has been named general manager of Mead Packaging's Atlanta plant, a division of Mead Corp. In his new capacity, he will

TRANSALL®
Pre-Lubricated Idlers...



Savings for the Pulp and Paper Industry

Transall pre-lubricated idlers are the product of years of experience in manufacturing belt conveyors for the pulp and paper industry. Bearings of Transall Pre-Lubricated Conveyor Idlers are factory sealed—never require re-lubrication. More important, perhaps, there is no leaking grease to deteriorate your conveyor belt. Entry of abrasive dust, foreign matter, etc., is kept to a minimum to prevent destruction of bearings, the heart of an idler. **Result:** No lubricating costs, longer belt life, idlers last longer, maintenance costs less.

Idlers are available in 20°, 35° and 45° equal and unequal length rolls with various roll diameters and thickness of tubing wall.

We also manufacture complete pre-engineered sectional belt conveyor systems. Write or wire Transall Inc., 109 No. 11th, Birmingham, Alabama, for complete details.

Perfectors of the Pre-Lubricated Idler

TRANSALL, INC.
109 North 11th St. • P. O. Box 1588
BIRMINGHAM ALABAMA

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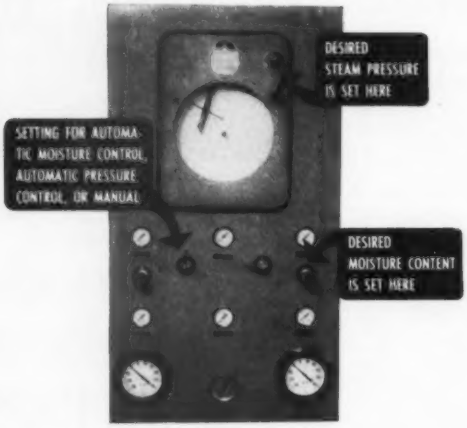
This moisture control works faster...needs less hand adjustment


DESIRED STEAM PRESSURE IS SET HERE
SETTING FOR AUTOMATIC MOISTURE CONTROL, AUTOMATIC PRESSURE CONTROL, OR MANUAL
DESIRED MOISTURE CONTENT IS SET HERE

Control panel of Stickle Pres-ten-trol automatic moisture control system houses controls and instruments for regulating, indicating and recording steam pressure in dryers and moisture variation in the sheet.

Only the improved Stickle automatic Pres-ten-trol moisture control system offers all these benefits . . .

1. Automatically maintains exact moisture content desired in any type paper or board within ½ of 1% guaranteed—regardless of machine speed.

2. Records or indicates moisture variation of sheet, steam pressure in dryers, time and duration of breaks.

3. Instantly regulates steam flow to dryers within preset limits. Violent fluctuations are eliminated by using both tension and pressure controls in dual operation.

4. Maintains desired steam pressure in dryers when paper is off the machine for start-up, wash-up, or wet end breaks. When break occurs, "electric eye" control shuts off steam or maintains steam pressure at preset level; restores proper moisture content up to 8 times faster than other controls.

5. Provides convenient adjustment and monitoring, with all controls and instruments located in one panel as shown above. No hydraulic pistons, chains, pulleys or weights.

6. Eliminates hand adjustment except where slight changes are desired for sharper control.

7. Reduces steam consumption because it admits only enough steam to maintain required moisture content.

Before you install any moisture control, get all the facts on Stickle's Pres-ten-trol. Write today for free Bulletin 360-C.

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Moisture Control Systems
Dryer Drainage Systems
Feed Water Heaters
Vacuum Pumps
Micro Adjustable Orifices
Differential Control Valves

Stickle Equipment
Cuts the cost of steam

For more data circle 136 on Post Card

FOREIGN ABSTRACTS

Molecular weight determinations and distribution of cellulose nitrates

This is a contribution from the University of Mainz. After examining critically the various methods for determining $[\eta]$ of cellulose nitrates, and after making numerous determinations on various types of cellulose and on celluloses having widely varying degrees of polymerization, the author concludes that the technique of Schulz and Blaschke (*J. Prakt. Chem.* **158,** 136 (1941) is not only a simple one, but is also very accurate. The cellulose nitrates examined included those prepared from various samples of cotton linters that had been mercerized and either oxidized or partially hydrolyzed, various types of kraft pulps, unfractionated (and in certain cases, mercerized), unfractionated sulfite pulp, *et al.*

When the velocity gradient (G) was kept unchanged, the factor $K\eta$ rises in the case of cellulose nitrates until $[\eta] = 2000$ is reached; thereafter, it remains nearly constant. The $K\eta$ values of mercerized and subsequently oxidatively degraded cellulose

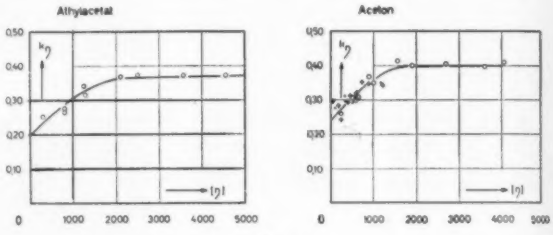

Fig. 1

nitrates show a steep rise. An improved fractionation of cellulose nitrate, and a method for determining the molecular weight distribution is also presented. The interrelationships between $K\eta$ and $[\eta]$ of cellulose nitrates in both acetone and ethyl acetate are shown in Figure I.

Sixteen references and 4 tables. Marianne Marx-Figini *Das Papier* 13, 572 to 578 (1959) (in German).

Effects of heating pulps separately and in admixture

When mixtures of pulps are to be used in papermaking, such pulps can be beaten separately or in admixture. In the latter instance it is interesting to determine, if possible, the behavior of each of the component pulps, and what effect they have on each other. In the present case the two pulps, used in equal quantities, were both sulfite pulps prepared from birch and from spruce. Prior to their admixture and to the beating operation, the birch pulp was dyed red with Brilliant Procian Red 5BS, and the spruce pulp was stained blue with Brilliant Procian Blue RS. These dyes are quite firmly sorbed on the fibers. The colored pulp after beating (for various time periods) was then fractionated, and in each, the fractions of the dyed fibers were counted and their fiber lengths measured.

The overall results, including the degree-Schopper-Riegler, tear factor and breaking lengths, were compared with data obtained separately with beaten, unmixed pulps. Although the results are not entirely conclusive, it appeared that the fiber length of the birchwood pulp was protected by the presence of the longer fibered coniferous pulp, and that the spruce fibers were the ones that were more seriously shortened. The physical properties of the mixed beaten pulps conformed roughly to the mechanical properties that could be predicted from those of each of the two pulps. Fig. 2 shows the percentage of the birch pulp fibers versus their fiber lengths, for pulps beaten separately and in admixture with spruce. Fig. 3 shows the breaking lengths of birch and spruce pulps beaten separately for various time periods, and for a 50-50 mixture of the two pulps.

This work was done at the Finnish Pulp and Paper Research Institute, but was reported in France. 10 references are given. W. Jensen, Lars Nordman, and J. Niemi. *Bull. Assoc. tech. ind. Papetiere* No. 6, 68 pp. (1958) (in French).

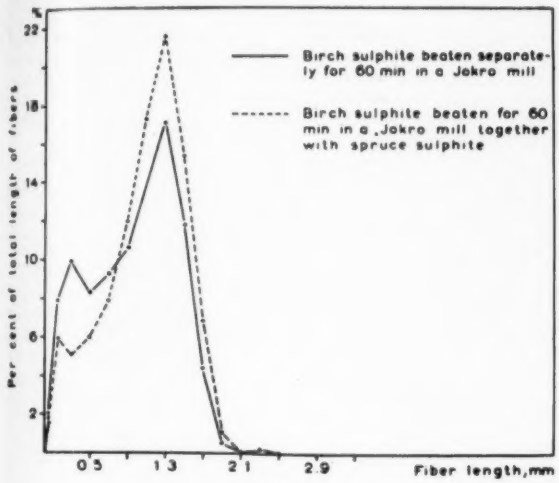
%
Per cent of total length of fibers
Birch sulphite beaten separately for 60 min in a Jokro mill
Birch sulphite beaten for 60 min in a Jokro mill together with spruce sulphite
0·5
1·3
2·1
2·9
Fiber length, mm

Fig. 2

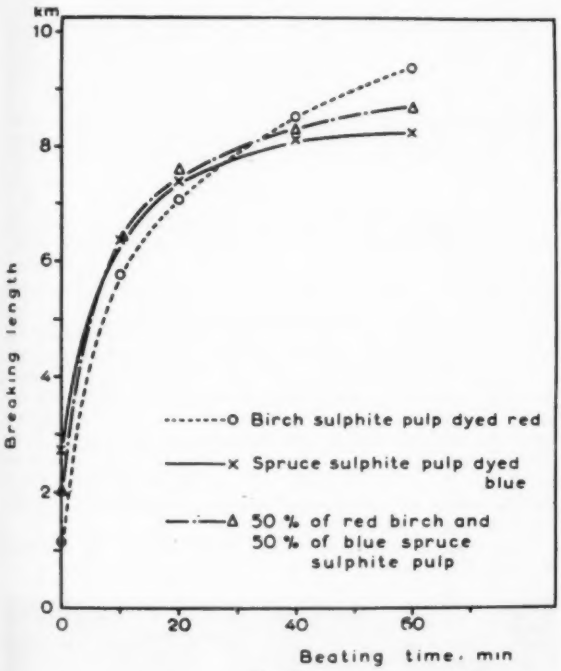
km
Breaking length
Birch sulphite pulp dyed red
Spruce sulphite pulp dyed blue
50 % of red birch and 50 % of blue spruce sulphite pulp
Beating time, min

Fig. 3

Kraft pulp for vulcanized fiber

Samples of vulcanized fiber were formed from kraft pulp, which had been bleached with chlorine dioxide, which had been treated with cold alkali, and also pulp which was formed after prehydrolysis. The vulcanized fiber made from such pulps was lower than the usual standard requirements. For example the vulcanized fiber made from prehydrolyzed pulp showed a folding endurance that was much lower than that obtained from rag stock. The treatment of the prehydrolyzed pulp with concentrated alkali, did not improve the properties of the final fiber; on the other hand more satisfactory results were obtained when the alkali concentrations were about 4 per cent.

A study was also made of the effect of beating on the vulcanizing properties of the sheet, and of the viscosity of cellulose in zinc chloride solutions that also contained varying amounts of

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calcium chloride. Apparently the optimum degree of beating was about 18 to 20 deg. Schopper-Riegler; a higher degree of beating impaired the bonding in vulcanized fiber. A lower degree of beating reduced the mechanical strength of the base paper. The viscosity of cellulose solutions which contained from 0.01 to 0.05 g. of zinc chloride per 100 cc. was not affected by pressure, but in more concentrated solutions which contained up to 0.4 g. of zinc chloride per 100 cc., "bio-structures" were formed, and a lowering of the viscosity with increasing pressures was observed.

Solutions of cellulose in zinc chloride are characterized by structural viscosity, even in the absence of other electrolytes. Addition of 0.2 per cent calcium chloride to these solutions promotes the formation of the bio-structures, but when higher concentrations of calcium chloride are added, the bio-structures are degraded and there is a sharp drop in viscosity. The lowered viscosity of cellulose solutions that contain higher amounts of calcium chloride may also be due to the lowered solubility of the cellulose in such solutions.

The bonding strength and the folding endurance of vulcanized fiber show an inverse relationship. In order to obtain a product with satisfactory bonding strength and also with a high folding endurance, the material used in vulcanizing must show a high degree of swelling in a 72-per cent solution of zinc chloride but must only undergo partial solubilization at the surface. Kraft pulps to be used in vulcanized fiber production should have the following properties: a lignin content of 1 to 1.5 per cent; a pentosan content of 4 to 4.5 per cent, an alpha-cellulose content of 93 to 94 per cent, and a cuprammonium viscosity of 400 to 450 millipoises. Solutions of zinc chloride in the commercial vulcanizing process may contain up to 0.4 per cent calcium chloride, but above this, the bonding becomes unsatisfactory. In order to obtain a vulcanized fiber of high folding endurance, a two-stage vulcanization is recommended. In an initial bath the zinc chloride solution should have a density of 1.80 to 1.83. In the second bath the density should be 2.004. [This is an abstract of 3 consecutive articles.]

Z. M. Kryukova and N. N. Nepenin. *Trudy Ivanovsk. Khim-Tekhnol. Inst.* No. 6, 81 to 88; 89-96; and 97-104; through *Zhur. Khim.* No. 12, 513 (1959); No. 16, 527 to 528; and No. 16, 528 (1959) (only the Russian abstracts were available) through the *Abstr. Bull. Inst. Paper Chem.* 30, 913 to 914 (1960).

Swelling of water-soluble cellulose ethers

The various stages of swelling and solution of such water-soluble ethers as carboxymethyl cellulose, methyl cellulose, and hydroxyethylcellulose are discussed, and in certain cases followed microscpocically in an excellent series of photomicrographs. The swollen residues or "gel particles" that are found in the suspension of aqueous solutions of commercial cellulose ethers appear to be the final stages in the swelling of fibers that were too weakly etherified, or in which the ether groups entered too irregularly.

In the five photomicrographs shown in Figure 4, all of them deal with the swelling of carboxymethylcellulose. (Ia) shows undissolved fibers mounted in alcohol-glycerol. Beadlike swelling is shown in (Ib). Spiral swelling is indicated in (Ic). (Id) shows what has been termed "transversal swelling," and (Ie) presents the disc-like particles, with concentric lamellar structures that are formed. The authors also give schematic drawings that indicate the various stages in the swelling process. The water-soluble ethers appear to undergo stages in swelling that are quite similar to those shown by native cellulose during xanthation, or when gradually dissolved by various cellulose solvents. In solutions of cellulose ethers or xanthates, the particle maximum is about one micron. The effects of staining and the use of polarized light are shown in Figure 5, in which discs of carboxymethylcellulose were stained weakly with Congo red and then photographed, indicating a crystalline order in the discs.

Eleven figures and 10 references. Julius Stawitz and Manfred P. Kage. *Das Papier* 13, 567 to 572 (1959) (in German.)

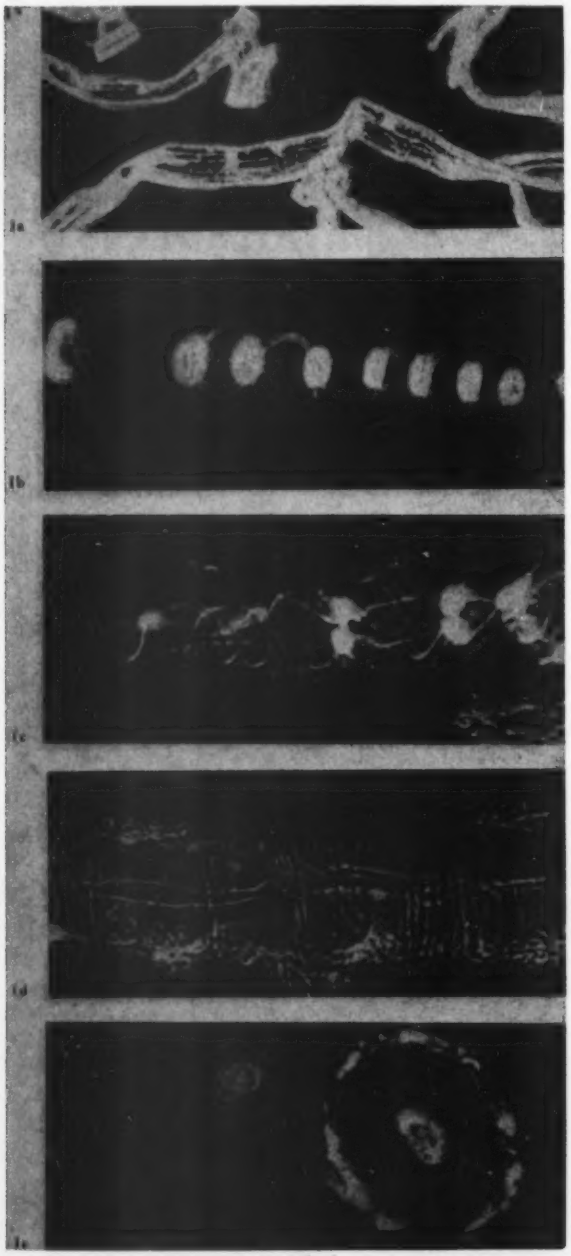

Fig. 4

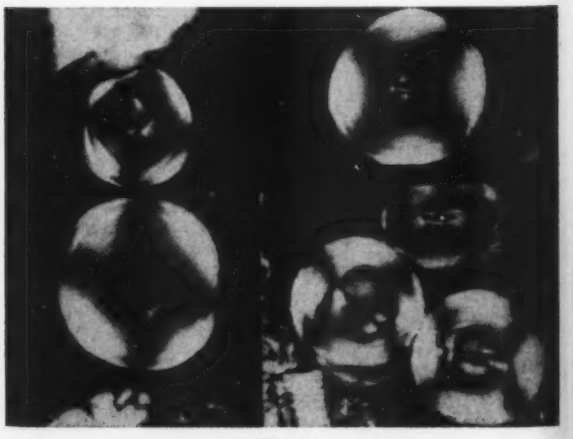

Fig. 5

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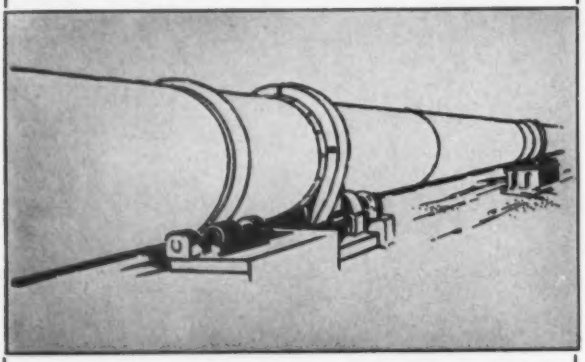

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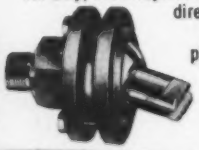

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PATENT REVIEWS

MELVIN NORD*

Method of de-inking waste paper

U. S. 2,916,412, issued Dec. 8, 1959 to Norman A. Altmann and William H. Bureau and assigned to Butler Co., describes a method of de-inking waste paper in cool water without the use of de-inking chemicals, so as to reclaim a large percentage of the fiber content as clean pulp.

In carrying out the process, the waste paper is first broken or coarsely pulped in a suitable piece of fiberizing equipment. The coarsely pulped stock is then introduced at room temperature into a high-speed revolving disk refiner where the coarse pulp is disintegrated and defibered in a matter of seconds and the heat generated produces a temperature rise which may be as much as 20 to 30°F. This disintegrating and defibering step constitutes one important feature of the invention and is combined with the step of washing or scrubbing the pulp at a relatively low consistency with submerged jets of wash water. A high-speed revolving disk type refiner such as a Bauer fibrator may be used for the first step. The pulp is fed into such a refiner between the centers of opposing disks and is centrifugally discharged at the periphery where it is first subjected to a very efficient and intensive disintegrating or defibering action in which the ink particles are shattered and loosened from the fibers. This action does not destroy or materially weaken the individual fibers but it does serve to shatter off or loosen ink and pigment particles with very little hydration.

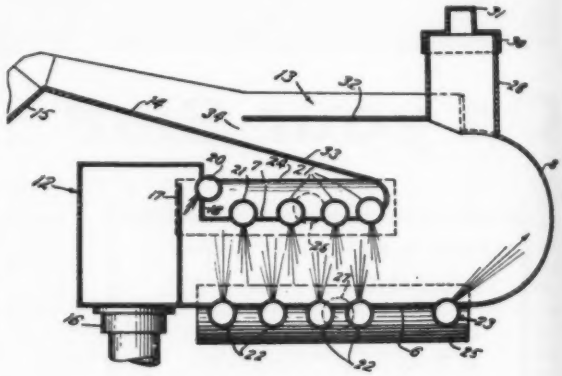


Fig. 1

After passing through one of these revolving disk refiners, the disintegrated and defibered waste paper pulp is intensively scrubbed or washed so as to free the fibers of ink and pigment particles. This washing operation is preferably carried out in an efficient submerged jet scrubber or washer, shown in Fig. 1, where the pulp is de-flocculated and subjected to the repeated cleansing and scrubbing action of high-speed, high-pressure submerged water jets. Preferably, the defibered and disintegrated pulp is subjected to two of such washing operations with the washed pulp being dewatered after each washing step so as to remove the particles of ink and any other free impurities. The resulting product will be a pulp which is substantially entirely free of all ink and pigment particles as well as any other loose foreign bodies.

Further information on the process and apparatus is also given in U. S. 2,916,216, by the same inventors (same date and same assignee).

Process for making hardboard

U. S. 2,918,398, issued Dec. 22, 1959 to Rodger M. Dorland, Maxwell M. Yan and Elliott G. Heslop and assigned to Abitibi Corp., describes a process for making artificial board.

A sheet of paper is applied to the upper surface of the wet lap

*Patent attorney, 17600 Pinehurst, Detroit 21.

after a large proportion of the water has been removed from the wet lap, but before it has been consolidated. It has been found that this produces an interlocking of the fibers of the paper and of the wet lap and a bonding between the paper and the wet lap due to the lignins, hemicelluloses and other natural binding constituents of the pulp.

The board thus has improved surface qualities, due to the fine fibers of the paper, and is low in cost.

Fourdrinier wire testing apparatus

U. S. 2,910,863, issued Nov. 3, 1959, to Lloyd Hornbostel and Edgar J. Justus and assigned to Beloit Iron Works, describes an apparatus for testing a fourdrinier forming wire of a paper making machine for wear and corrosion.

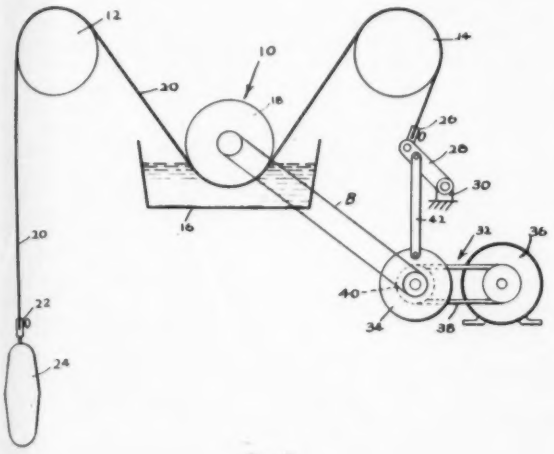


Fig. 2

As shown in Fig. 2, the apparatus 10 includes spaced pulleys 12 and 14, which are mounted for rotation. A container 16 is interposed between the pulleys 12 and 14, and in this container, partially submerged, is a pulley or roll 18. A fourdrinier wire 20 is trained over the rolls 12 and 14 and under the roll 18 so that a portion is immersed in corrosive liquid in the container 16. This corrosive liquid may take the form of white water, thus simulating actual conditions of operation of a paper making machine.

At one end of the wire 20 is a clamp 22 which is secured to a weight 24. At the other end of the wire 20 is a clamp 26 which is pivotally connected to a lever 28, the other end of which is connected to a fixed lug 30. Reciprocation mechanism 32 includes a disk 34 rotated by a motor 36 through the medium of a belt 38 and a pulley 40. Connected to the edge of the disk 34 is one end of a crank arm 42, the other end of which is pivotally connected to the lever 28. Thus, upon rotation of the disk 34, the lever 28 and the wire 20 are subject to a reciprocating motion so that a predetermined portion of the wire is passed successively through the liquid.

The forming wire 20 is trained over the rolls 12 and 14 and under the roll 18 and maintained in taut condition by the weight 24. The wire is first tested for thickness, weight and the extent of the open area. After a predetermined number of passes of the wire through the liquid, the wire is removed from the apparatus and is tested as to thickness, weight and extent of open area. A comparison is then made with the pre-test values. The change in open area may be conveniently determined by conventional mesh tests or by the difference in the ability of the wire to pass light.

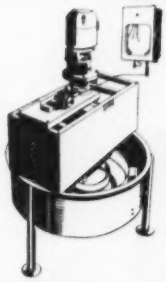
Control of slime in paper making systems

U. S. 2,915,428, issued Dec. 1, 1959 to Elliott L. Weinberg and assigned to Metal & Thermit Corp., describes a process for controlling slime in paper making systems, and for the production of chemically treated paper possessing biocidal properties.

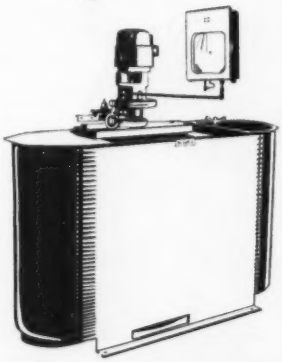
A small amount of bis-tributyltin oxide is introduced into the pulp system. Substantially all of the tin thus added goes into the paper manufactured by the process. The papers thus manufactured are resistant to attack by micro-organisms.

(Continued on page 143)

Pan Type



Pipe Line Type



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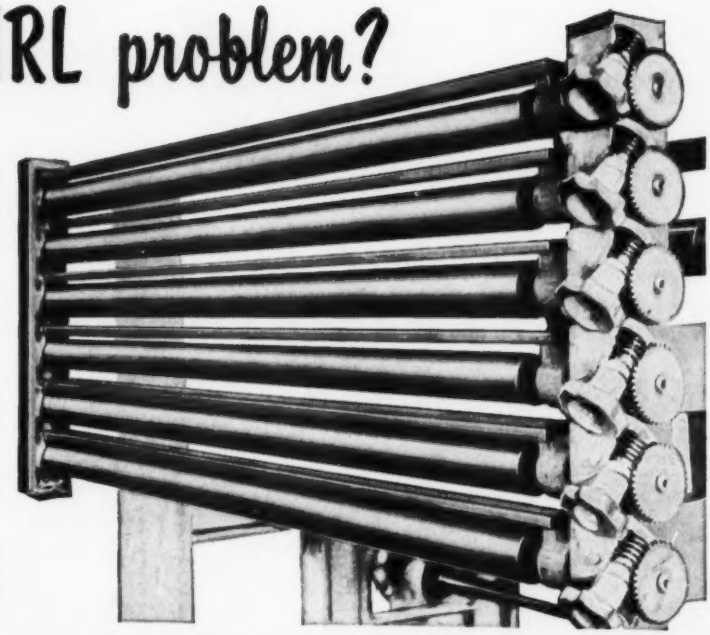

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Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Doctor knives	D.S.T. Pattern & Engr. Co. Ltd.	2,914,788	12/1/59
Paper tube for use as a mold for forming concrete columns	Sonoco Products Co.	2,914,833	"
Self-contouring bags	Central States Paper & Bag. Co.	2,915,098	"
Container for frozen foods	Swift & Co.	2,915,235	"
Carton and handle structure	General Foods Corp.	2,915,236	"
Continuous winder for paper	The Black-Clawson Co.	2,915,255	"
Apparatus for feeding flat stock	George A. Gibson, Jr.	2,915,310	"
Method of handling and conditioning paper making clay	Georgia Kaolin Co.	2,915,412	"
Control means for a doctor blade	William P. Miller	2,915,421	"
Machine for making composite packing paper	Societa per Azioni Fabriche Fiammiferi Ed Affini	2,916,080 & 2,916,411	12/8/59 "
Carton	William P. Frankenstein	2,916,194	"
Box-like cartons	Harry F. Gatward	2,916,195	"
Box	The Diamond Gardner Corp.	2,916,196	"
Removal of ammonium ions from sulfate pulping liquors	J. F. Pritchard & Co.	2,916,355	"
Four-cell compartmented carton	Mead Packaging, Inc.	2,917,202	12/15/59
Combination carton and cooking receptacle	Waldorf Paper Products Co.	2,917,218	"
Container	Owens-Illinois Glass Co.	2,917,219	"
Bottle carrier	P. Ballantine & Sons	2,917,220	"
Multi-purpose container	The Pillsbury Co.	2,917,221	"
Carton	William P. Frankenstein	2,917,222	"
Non-slip bag	The Cromwell Paper Co.	2,917,223	"
Paper and coin container	Bankit Container Co.	2,917,224	"
Apparatus for pulping waste paper	John W. Bolton & Sons, Inc.	2,917,245	"
Flat gummed paper	Dennison Manufacturing Co.	2,917,396	"
High wet strength papers	Monsanto Chemical Co.	2,917,427	"
Fourdrinier wire belt	H. K. Porter Co.	2,918,094	12/22/59
Display stand	New Haven Board & Carton Co.	2,918,178	"
Tamper-proof box	American Box Board Co.	2,918,205	"
Handle structure for boxes	The Interstate Folding Box Co.	2,918,206	12/22/59
Apparatus for decurling a web	Mercury Engineering Corp.	2,918,897	12/29/59
End dike for a paper coating machine	Rice Barton Corp.	2,918,899	"
Paperboard article carrier	Federal Paper Board Co. Inc.	2,919,050	"
Carton	Green Bay Box Co.	2,919,060	"
Process for finishing coated paper	S. D. Warren Co.	2,919,205	"
Method for making glass paper	L-O-F Glass Fibers Co.	2,919,221	"
Paper making process	Wyandotte Chemicals Corp.	2,919,222	"
Felting apparatus	International Paper Co.	2,919,475	1/5/60
Drying section for a paper-making machine	The Bowater Research & Development Co., Ltd.	2,919,495	"
Paperboard display stand	Waldorf Paper Products Co.	2,919,815	"
Paperboard bottle carrier	Mead Packaging, Inc.	2,919,829	"
Reclosing carton	Edward G. Farrell et al	2,919,843	"
Carton for cups	American Box Board Co.	2,919,844	"
Closure means for dispensing cartons	Saul A. Hackmyer et al	2,919,845	"
Container for foods	Allen Cartons, Inc.	2,919,846	"
Machine for beating paper pulp	Emile J. A. Lejeune	2,919,863	"
Apparatus for closing containers	Jagenberg-Werke A. G.	2,920,432	1/12/60
Manufacturer of envelopes	Wilhelm Doetsch	2,920,539	"
Paper machine coating arrangement	Beloit Iron Works	2,920,698	"
Paper making apparatus	The Sandy Hill Iron & Brass Works	2,920,699	"
Pulp molding machine	Diamond National Corp.	2,920,700-2	"
Carton dividers	Hunt Foods, Inc.	2,920,782	"
Twin-compartmented article carriers	Diamond National Corp.	2,920,791	"
Molded pulp fruit tray	Diamond National Corp.	2,920,805	"
Container with sanitary end closure	Howard M. Hill	2,920,806	"
Integral cleat container	Robert M. Bruce	2,920,807	"
Shipping container for fragile irregularly shaped articles	Owens-Illinois Glass Co.	2,920,808	"

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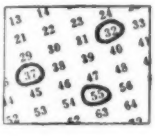

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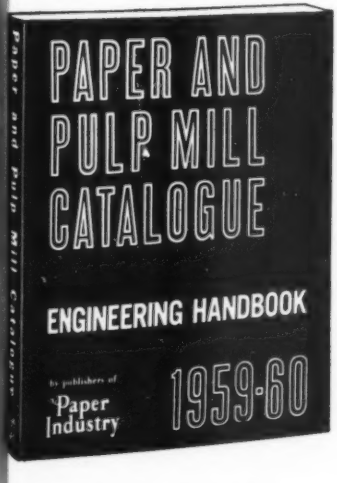

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ON THE DESKS OF MEN WHO SPECIFY AND BUY IN . . .

Every operating paper and pulp mill in the United States and Canada

A one-volume, composite Catalogue or permanent classified Reference File of manufacturers' catalogues, a Buyers Service Section, and the Engineering Handbook. Published annually in September.

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FOR FURTHER INFORMATION ON

- New Products
- New Literature
- Advertised products and services

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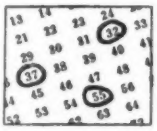

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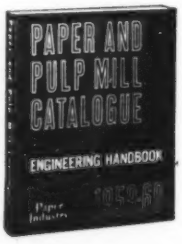
- **Engineering Handbook Section** — a compilation of practical engineering data, formulas, graphs, charts, tables, etc., including a section dealing with uses and hazards of chemicals used in pulp and paper making. New material added yearly.



Paper and Pulp Mill Catalogue
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431 South Dearborn Street
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NEW PRODUCTS

These items are numbered for your convenience. Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

Air-cooled extruder

A new addition to a line of extruders, an air-cooled model, is to be used where the need for dissipating heat is not severe. A 3½-in. model with an L/D ratio of 20:1, has a cooling system which consists of three 1/3-hp blower with duct work arranged so that uniform air flow may be achieved around the full circumference of the cylinder at high velocities. These blowers are automatically controlled by the 3-position proportioning type indicating temperature controllers, thereby eliminating any guess work on the part of the operator. *Frank W. Egan & Co.*

Circle No. 1 on Readers' Service Card

Triple-range electronic stroboscope

A new stroboscope, now available, is designed for speed measurements between 200 and 15,000 rpm in three ranges: 200 to 900, 900 to 3600 and 3600 to 15,000 rpm. The instrument's neon discharge tube produces a sharply focussed red light which can be easily observed in daylight. All measurements are done on electrical and optical principles using the stroboscopic effect and require no mechanical coupling to the part under examination.

It has a maximum flashing frequency of 250 c/sec. Accuracy is possible to a reported plus or minus ½ of one per cent. Approximate weight is 4 lb. *Kernco Instrument Co. Inc.*

Circle No. 2 on Readers' Service Card

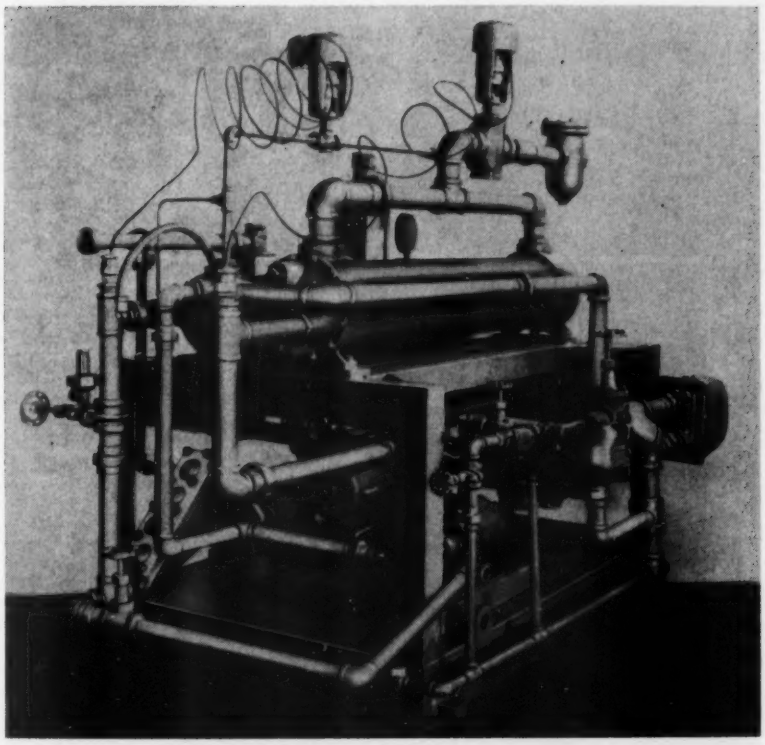
Ultraviolet absorbers

Two new ultraviolet absorbers, Uvinul N-35 and Uvinul N-38, are the first of a new family which are chemically identified as substituted acrylonitriles. Unlike other UV absorbers, they do not contain acidic aromatic hydroxyl groups, and show excellent UV absorption properties under varying pH conditions.

These new products are said to be particularly suitable for protecting nitrocellulose lacquers against UV degradation without adding undesirable color to the coating.

Suggested applications include a variety of industrial and consumer product uses, including plastics, lacquers and paints, adhesives, packaging materials and paper-coatings. *Dyestuff & Chemical Div., General Aniline & Film Corp.*

Circle No. 3 on Readers' Service Card



Paste size emulsifier

A new automatic paste size emulsifier, when not producing finished size emulsion, recirculates and reheats the size paste. The packaged emulsifier, developed jointly by Milton Roy Co. and Monsanto Chemical Co., provides a continuous supply of fresh size. Because there is no prolonged storage, the size does not oxidize or develop excessive foam.

The emulsifier uses low-pressure steam and is very compact, occupying only 30 sq. ft. of floor space. Standard units emulsify up to 30,000 lb. per day of fortified rosin-based size pastes of 70 or 77 per cent solids content to finish sizes of 2 to 6 per cent solids, as desired. They are supplied as completely wired and piped packages ready for connection to paste, water, steam and electrical lines. *Milton Roy Co.*

Circle No. 4 on Readers' Service Card

Paper stock pump

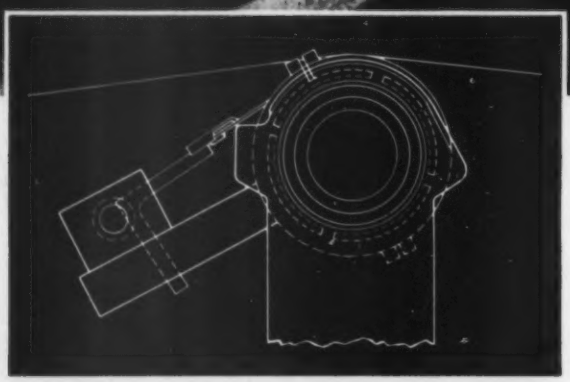
An established paper stock pump (PW) line has recently been expanded by the addition of a modified unit (PWK) which, equipped with an 8-in. impeller eye and a 1-¾-in. sphere size, permits pumping paper pulp at low capacity without air binding or plugging.

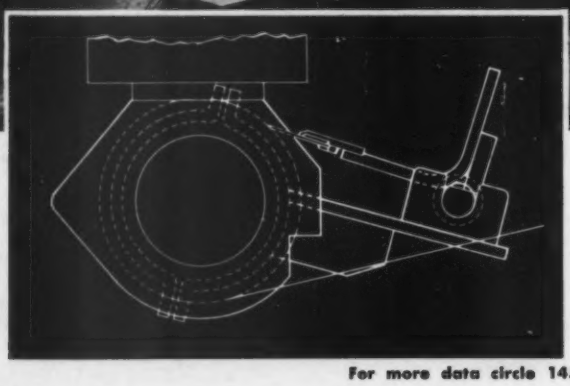
This PWK pump is available in sizes 8 by 4, 10 by 4 and 16 by 4 in. The first two are designed to handle pulp up to a 5-per cent consistency, and the latter will handle over 5-per cent consistency pulp. Superseding the 5 by 4-in. PWG unit, these new pumps can be either oil or grease lubricated with open or enclosed impeller at heads to 270 ft. and capacities to 1200 gpm. *Allis-Chalmers Mfg. Co.*

Circle No. 5 on Readers' Service Card

Improved tapioca flour

An improved tapioca flour for the paper and corrugating industries, Thai Crown No. 61, is pre-tested in Thailand to assure compliance with standards, and all shipments are tested on arrival in the U.S.A.





Doctored Clean by Lodding

WIRE ROLLS ARE KEPT CLEAN — absolutely clean — when they're Lodding-doctored.

Clean rolls on the Fourdrinier are all-important. They add life to wires, increase production, contribute to the quality of the sheet, while cutting costly downtime.

Every day hundreds of mills are profiting from Lodding's exclusive specialization in doctoring. Whether it be for a breast roll, return wire, stretch, wash or wire guide roll, each Lodding Doctor is engineered and custom-made for installation on a specific machine roll.

Proper balance and alignment are built into each doctor — to prevent friction drag, wire or roll damage. Doctor backs, blades and holders come in a wide variety of corrosion-resistant materials, their selection depending upon the particular mill conditions.

From the wet end to the reel Lodding is well qualified with over 30 years of specialized experience to handle every doctoring need, no matter how complex.

Call Lodding or your nearest sales representative for complete information.

LODDING
Engineering Corporation
AUBURN, MASSACHUSETTS

For more data circle 145 on Post Card

New Products . . .

This material has a high initial viscosity with good viscosity retention and excellent tolerance to borax and caustic.

Thai Crown No. 61, normally used as a raw portion of the corrugated starch process, can also be used as a carrier. The material reacts well to enzyme modifications, where the raw starch is modified to reduce its viscosity. *Morningstar® Paisley Inc.*

Circle No. 6 on Readers' Service Card

Petrothene 205-15

A new polyethylene coating resin, Petrothene 205-15, develops maximum adhesion to a wide variety of substrates, is easily processed and permits excellent heat seals over a relatively wide range of sealing temperatures. This coating resin, with a density of 0.924 and a melt index of 3.0, is said to provide 100 per cent greaseproofness at a lower coating weight than other resins of similar melt index and density.

Flow characteristics of Petrothene 205-15 are reported to be well suited for high speed extrusion coating. Coatings as thin as 0.5 mil can be applied easily. Neck-in, resulting in costly trim loss, is reduced to a minimum. Polymer build-up at the die has been virtually eliminated. The total effect is an easily handled, excellent working resin for all substrate coating applications. *U. S. Industrial Chemicals Co., a Division of National Distillers & Chemical Corp.*

Circle No. 7 on Readers' Service Card

Neolyn 23

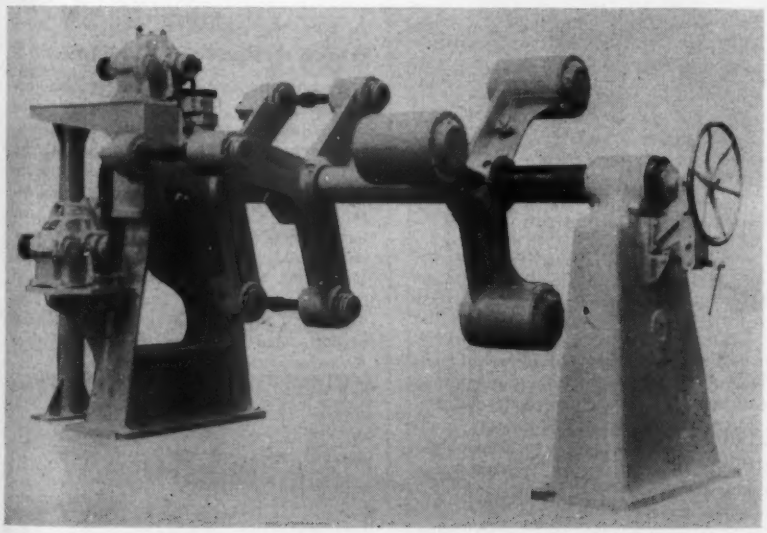
A rosin-derived oil-free alkyd, Neolyn 23, is said to combine well-known rosin-resin properties of adhesion, gloss, solubility and compatibility with the toughness and dimensional integrity which are characteristic of a linear polyester.

Thus, Neolyn 23 is useful in a variety of latex, solvent and hot-melt adhesives. To these it contributes, as needed, adhesiveness, strength, gloss, pigment (and filler) wetting and bonding, flexibility, grease-resistance, heat stabilizing action, and ease of milling and processing. *Hercules Powder Co.*

Circle No. 8 on Readers' Service Card

Stanmount

Stanmount, a noise and vibration dampening material, is available in a complete line of engineered high-density felt pads which are treated for indefinite use and reuse under machinery. Stanmount is not affected by oil saturation, and has been treated to resist water and moisture con-



Three-arm reel

The most recent design in 3-arm reels by Appleton Machine Co. is said to point up many improvements in the important area of lessening downtime on windup and unwind operations. The 3-arm reel is available for both shaft and shaftless applications.

It features 3 pairs of radial arms set 120° apart circumferentially, the unwind pair being positioned 60° above the horizontal and the windup pair being located 60° below the horizontal and directly below the unwind. The third pair of arms for unloading finished rolls and loading new rolls is located on the horizontal.

The arms on the shaftless model are readily adjustable for varying roll widths and both models contain the latest indexing and interlocking devices.

When used in conjunction with suitable hoisting or lifting equipment, the 3-arm reel can lessen operating interruptions and effect considerable production economies. *Appleton Machine Co.*

Circle No. 9 on Readers' Service Card

NOW—CHECK ACCURACY WHILE YOU CHECK MOISTURE!

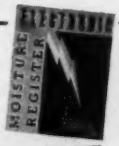
New Electronic Moisture Registers have first "built-in standard" in a 3-second, portable moisture tester.

NOW DIAL ACCURACY IS ASSURED, even under the extremes of production-line use. With *self-checking standard*, Moisture Register's new Model 5's are checked and adjusted for calibration accuracy right on the job—by any untrained operator. He simply fits electrode to standard. Then with new trimmer he sets dial for perfect alignment. Gives calibration adjustment *in the field*. You get practical accuracy down to 0% . . . 3-second spot tests for moisture wherever your product may be. Portable, light weight, battery operated, new rugged construction with miniature tube. Factory-set to your needs.

For faster testing of—

- Paper Stock
- Paperboard
- Insulation boards
- Paper Bags
- Plastics

SEND FOR NEW TECHNICAL DATA and information on 2-week free trial.



ELECTRONIC MOISTURE REGISTER Instruments

Moisture Register Company, Dept. PI
P. O. Box 910, Alhambra, California
Please send data on new Model 5's.

We are testing _____

in moisture range from _____% to _____%

Firm _____

By _____ Title _____

Address _____

City _____ State _____

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Hop On The Jenkins' METLKOR Bandwagon

You'll have plenty of company, for Paper Mill men everywhere are using Jenkins' METLKOR brushes for every paper brushing application. They are built better, to perform better, and last longer.

Jenkins' METLKOR Paper Polishing Brush.

JENKINS' PAPER MILL BRUSHES

Blanket washer • Coating • Conveyor • Dampening • Dusting • Feed • Felt cleaning • Flocking • Fourdrinier wire cleaning • Nutmeg roll cover • Offset powder removal • Paint brush • Polishing • Scrap removal • Sieve • Spray • Static elimination • Void detector • Web cleaning.

BRUSHES FOR PRINTERS: Cylinder hold down • Dusting • Nutmeg roll cover • Offset dampener roll cleaning • Offset powder removal.

Specify Jenkins' METLKOR the original . . . the best *Metal-Core* brush

METLKOR®
CYLINDER BRUSHES
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For more data circle 147 on Post Card

New Products . . .

ditions. A quick-bond adhesive, used with this product, reportedly bonds equipment with a vertical pull or shear equal to a minimum of 90 psi of mounting area.

Said to reduce transmitted vibration by 85 per cent, Stanmount is manufactured in three densities: 50; 100; 250 psi. *Hilman Equipment Co.*

Circle No. 10 on Readers' Service Card

Air-hydraulic boosters

Boosting ordinary compressed air (80 psi) up to 3000 psi hydraulic pressure without the use of any additional power or need for pumps or motors, a new line of air-hydraulic boosters is said to provide an economical, convenient means of stepping up power for multi-purpose production uses. Simply and compactly designed, the booster saves space and permits its use for powering such equipment as spot welders, "C" frame riveters, hydrostatic testing equipment, workholding fixtures and bench or arbor presses.

In addition to air-to-oil boosters, oil-to-oil models are also available with identical mounting dimensions. Boosters can also be supplied with an integrally mounted tank which results in added economy since it eliminates or reduces customer-furnished piping. (Air-to-oil model with integrally mounted tank is illustrated above.) *S-P Mfg. Corp.*

Circle No. 11 on Readers' Service Card

Synchronous motors and magnetic drives

Bracket-bearing synchronous motors, available as the E-M line, are rated at 60 hp and up. With speeds from 500 to 1800 rpm, the motors operate on 60- or 50-cycle standard voltages and are built in a wide variety of enclosures.

A new line of variable-speed magnetic drives has been designed expressly for pump application. Of vertical construction, the machines are matched to fit standard vertical motors. The drives are air cooled, speed variation is reported at between 0 and 1740 rpm and the power range is from 3 to 310 hp. An automatic speed-control circuit is part of the drive package. *Electric Machinery Mfg. Co.*

Circle No. 12 on Readers' Service Card

Beater bars and bed plates

Beater bars and bed plates are now available to the paper industry in a large variety of standard and custom patterns for every type and make of beater. All bars and plates are individually manufactured and processed according to specific stock fiberizing and mixing requirements. They are available in either carbon or alloy steel, although special heat treated stainless steel bars are obtainable, possessing highly acid-resistant qualities.

Bed plates are provided either in solid steel or laminated with oak spacers. They are shipped completely assembled and ground, ready for installation. *Simonds-Worden-White Co.*

Circle No. 13 on Readers' Service Card

Trefoil design for rotary kilns

A unique, trefoil, refractory heat-exchanger design has been developed for rotary limestone and lime sludge kilns.

A preheated charge, passing through the trefoil, tends to moderate the temperature in the hottest zone. Accordingly, the development of excessive accretions in high temperature zones with certain fuels, may be reduced with consequent extension of lining life. Other important over-all benefits, are fuel savings and increased production in kilns which are not overloaded beyond rated capacities. *Harbison-Walker Refractories Co.*

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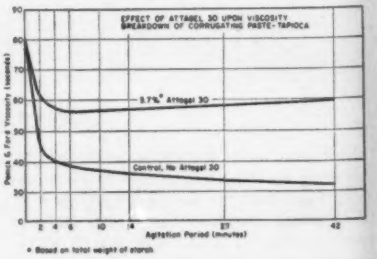

EFFECT OF ATTAGEL 30 UPON VISCOSITY BREAKDOWN OF CORRUGATING PASTE - TAPIOCA
3.7%* Attagel 30
Control, No Attagel 30
Agitation Period (minutes)
* Based on total weight of starch

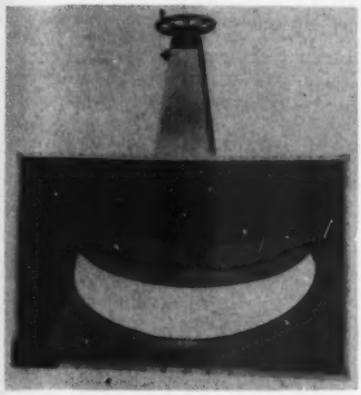
Viscosity stabilizer

A new low-cost grade of colloidal attapulgite, called Attagel 30, is designed to counteract the viscosity breakdown inherent in starch corrugating adhesives. This new material increases in viscosity under the action of shear forces, as in the recirculation

systems used in corrugated production processes. Laboratory test results with a tapioca corrugating starch adhesive are shown in the graph.

Attagel 30 has reduced adhesive consumption by as much as 20 per cent in field tests. Other operating advantages attributed to its use on corrugating lines have been the elimination of flooding, increased operating speed, reduced frequency of glue-roll adjustments and improved bond due to better penetration and spreading properties on highly sized board. *Minerals & Chemicals Corp. of America.*

Circle No. 15 on Readers' Service Card



Shut-off damper

A new shut-off damper for flue gas ducts, now available, consists of a damper housing, a valve disc and an operating device. The damper is absolutely tight-fitting and very simple in operation. No dust from the flue gases can accumulate to obstruct the damper's function.

The damper is designed for easy installation in various systems of flue gas ducts. It is manufactured in standard sizes capable of handling gas or air quantities from 6000 to 250,000 cu. ft./min. *American SF Products Inc.*

Circle No. 16 on Readers' Service Card

Circular slide rule

Production has been started on a handy circular slide rule for engineers and for other plant and office executives. Any executive who must perform simple calculations, will find this convenient, pocket-size calculator extremely useful in his work.

Operation of the rule is simple and the results are accurate. To multiply, divide and find proportions is said to be easy and exceptionally fast. Complete, easy-to-follow instructions will be included with each slide rule.

Sent free to engineers and plant or office executives, the slide rule may be purchased by others for 50c. *General Industrial Co.*

Circle No. 17 on Readers' Service Card

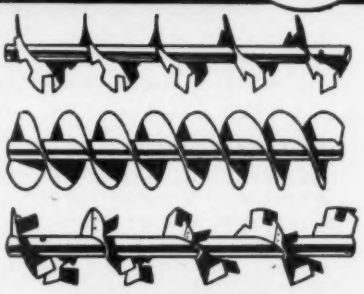
Hydraulic pump

This new 6-gpm delivery unit has been added to a line of vane-type, variable-volume hydraulic pumps. While specifically designed for low-cost machine tool drill feed and automation applications, the new unit will find wide use in circuits that require pump delivery to vary according to system needs, while maintaining preselected adjustable pressure.

The pump's variable-volume and pressure-compensation features eliminate the necessity for a relief valve and attendant piping. For most circuits, little more is needed than tank, pump and actuating member. The unit is designed for operation with 1800-rpm electric motors and is available for flange, foot or gasket mounting. *Vickers Inc.*

Circle No. 18 on Readers' Service Card

Make the HAMMOND LINE your choice for Elevating and Conveying Needs!



SCREW CONVEYOR
IN ALL TYPES AND DIAMETERS

We manufacture Screw Conveyor to suit every need. Let us equip your elevator with the finest.

Screw-Lift

—conveys horizontally and elevates to any practical height. A time, labor and money saver. Ideal for flour mills and feed plants, handling material from processing to storage and/or to packaging. Write for Form M-500-2.

Screw-Veyor

—a tubular conveyor which eliminates material build-up and moth webbing within housing. Clean, accessible, fast, moisture and dust proof. Write for Form M-600-2.

BUCKET ELEVATORS and BUCKETS

We manufacture centrifugal discharge Bucket Elevators for high or moderate speeds. We offer improved designs, plus a wealth of scientific data relative to Elevator construction—and, a full line of high capacity buckets.

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We manufacture troughing to suit every purpose. Standard, Flared, Weather-proof, Tite-Seal or Dome Cover, also Drop Bottom Trough, in standard as well as in tubular type. Write for Engineering Bulletin No. 158.

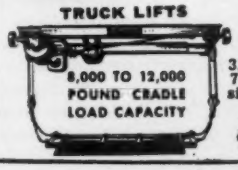
Kewanee

HYDRAULIC TRUCK DUMPERS

If you receive wood chips or other bulk material by truck, you need a Kewanee Hydraulic Truck Dumper. Kewanee Quality is backed by 39 years of experience plus periodic inspection service.

KEWANEE FLEXIBLE LOADING SPOUTS

TRUCK LIFTS



8,000 TO 12,000 POUND CRADLE LOAD CAPACITY

3, 5, and 7½ H.P. sizes for 10 to 15 ft. driveways.

The NEW Super-Flo CONVEYOR

Operates in a standard "U" Shaped Trough. Ideal for handling fragile material. Carries a deep load horizontally or on incline. Ask for Bulletin SF-659-A.

PATENTED "TITE-SEAL" COVER AND CLAMPS
HEAVY-DUTY CHAIN WITH FLIGHTS ATTACHED AS REQUIRED
HEAVY STEEL BARS SUPPORT RETURN STRAND
FLIGHTS OF TOUGH NON-METALLIC MATERIAL
STANDARD "U" SHAPED TROUGH

Screw Conveyor Corporation
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ENGINEERS MANUFACTURERS
TRADE MARK REG. PRODUCTS U.S. PAT. OFFICE

For more data circle 148 on Post Card

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NEENAH WIS.
"CONCENTRI-CORE"

Permanent Winding Core for paper mills, converters and printers.
For more data circle 149 on Post Card

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DEPENDABLE
FELTS
The WATERBURY Felt Company
SKANEATELES FALLS, N. Y.
For more data circle 150 on Post Card

New Products . . .

Impregnation for corrugated board

A readily applied impregnation for ordinary corrugated board, now available, is said to improve its structural qualities to a very high degree.

Impregnation permits bulk and strength with little weight when compared with other similar materials. This new development is expected by the manufacturer to economize and revolutionize such basic industries as luggage, light construction, small furnishings and packaging. *Ebrlich & Irany Inc.*

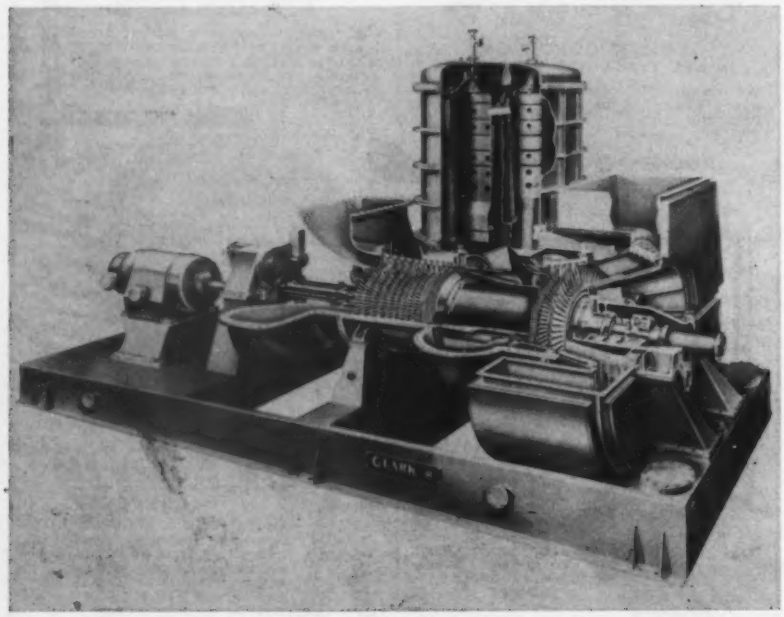
Circle No. 19 on Readers' Service Card

Pulp-freeness tester

Continuous measurement of pulp freeness, heretofore determined only through laboratory tests, is now possible with a new device known as the Bailey Continuous Freeness Recorder. With an incorporated, automatic control, the tester could also maintain freeness at a predetermined value.

During a six-month operational period, the device has been successfully applied to four different types of pulp which covered a range of 150cc to 600cc freeness. *Bailey Meter Co.*

Circle No. 21 on Readers' Service Card



Single-shaft gas turbine

A new open-cycle, single-shaft gas turbine with a NEMA rating of 9000 bhp, known as model 305-S, burns either liquid or gaseous fuels and is reportedly capable of continuous operation under full load conditions at a normal rated speed of 5000 rpm. In applications requiring limited speed flexibility, the 305-S provides a low-cost, reliable source of rotative power for centrifugal compressors, power generators and liquid pumps.

Gas turbine control is achieved by regulation of the fuel flow rate. Furnished as standard equipment is a pneumatic control system which provides semi-automatic starting and shutdown, automatic control of output speed and horsepower, automatic limiting of turbine-inlet temperature, and operation on a 60-psig instrument air supply. *Clark Bros. Co.*

Circle No. 20 on Readers' Service Card

Pulper for laboratories

The Emerson "triple attack" pulper is now available in a smaller model, for use in laboratories. Identical in design to the mill-size pulpers, but with a 100-lb. capacity, this model has lobe shaped, tapering walls.

Defibering occurs at the impellor, along the tub walls and at a vortex which is formed where four stock streams, directed inwards and downwards by the lobed and tapered walls, make contact with the faster moving stock from the impellor blades. *Emerson Mfg. Co. Div., John W. Bolton & Sons Inc.*

Circle No. 22 on Readers' Service Card

Clutch-brake combination

A new miniature clutch-brake combination 2.2 SMCB, recently placed on the market, is a combination in which both clutch and brake are magnetically set. When the current is on the clutch magnet and off the brake magnet, the clutch will operate, and vice versa. There is also a neutral position, when current is turned off both magnets, in the event free-wheeling is required.

This unit is available in any dc-voltage up to and including 90 v., has a 1.55 current rating, has 8-lb.-in. torque on both clutch and brake side, and comes complete with bearing mounted drive and driven shafts. *Stearns Electric Corp.*

Circle No. 23 on Readers' Service Card

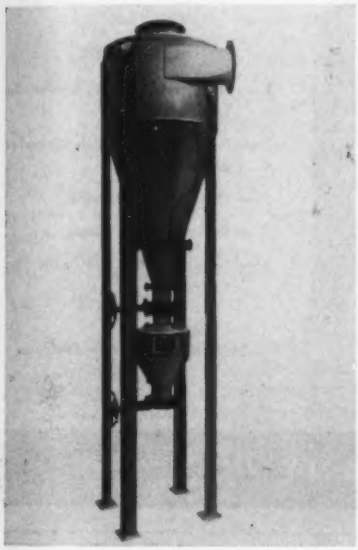
Wedge-wire screen

A new wedge-wire screen known as Rima and made of wire with thinner profiles

than previously available, can be used for screening, sifting, de-watering, sizing, washing and filtering materials, chemical products, paper-coating materials and food products.

Rima screens are made of stainless and carbon steels. They are furnished in rectangular, oblique-angled, round and oval beds with sharp or round bends. Conical segments, cylindrical troughs and many other special shapes are available. *Cross Perforated Metals, National-Standard Co.*

Circle No. 24 on Readers' Service Card

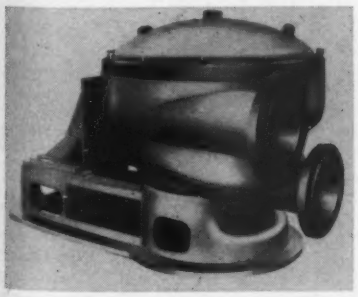


Centrifugal cleaner

A low pressure drop centrifugal cleaner for removing trash from furnish, called the Nichols Precleaner, may be used ahead of screens, high pressure drop cleaners or in stock preparation systems at pulpers. Advantages of this new unit are large capacity, small space requirements, no moving parts and low pump head requirements.

Units are furnished in either mild or stainless steel, with manually operated valves or push-button control. Three sizes are available to handle volumes from 1500 to 6000 gpm with a single unit. *Nichols Engineering & Research Corp.*

Circle No. 25 on Readers' Service Card



Small model centriscreen

The model 6 centriscreen, now available, is built entirely of stainless steel. Only 30 in. high and 34 in. wide, it is reportedly capable of delivering up to 1200 gal. of clean, shive-free stock per min. It runs quietly, smoothly and effectively from the moment of start-up, featuring continuous operation without screen-plate breakage or erosion.

The model 6 is a totally enclosed screen, delivering stock to the head box at the desired pressure. The screen plates require no washing so that the volume of fresh-water input is reduced and higher stock temperatures are permitted. *Bird Machine Co.*

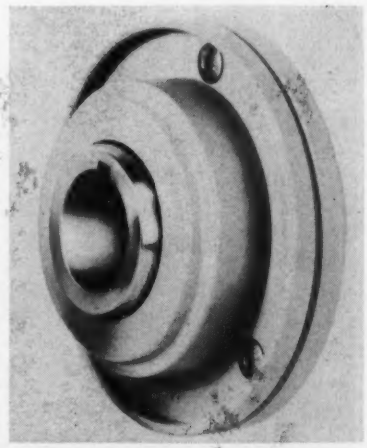
Circle No. 26 on Readers' Service Card

Improved WATER-SKIPPER

An improved WATER-SKIPPER, Anti-Resin & Anti-Corrosive agent, is a new formulation based upon a unique synergism between polysiloxanes, silicone polymers and methyl tung-oil esters. The resulting formulation is said to be highly resistant to both high and low temperatures, high humidity conditions, as well as chemical fumes and vapors. When sprayed onto metal and other surfaces, a fine non-oily, wax-like film is deposited.

Specifically designed to protect various resin-, latex- and sizing-application equipment against excessive and expensive shutdowns for removal of build-up, WATER-SKIPPER will be offered in a standard 16-oz. can, 12 cans per case. It will also be available in 7½-gal. pails and 30-gal. drums. *Textile Adjuncts Corp.*

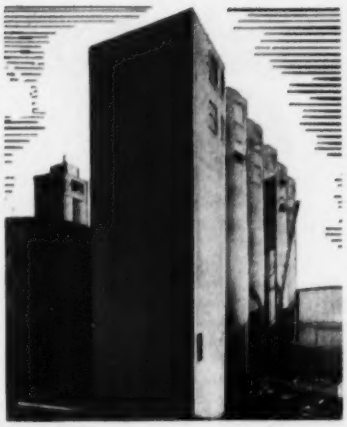
Circle No. 27 on Readers' Service Card



New motor-coupling features

Three new features have been added to the line of MC geared flexible motor couplings. A corrosive duty cover made of polypropylene, is said to have exceptional resistance to acids, alkalies and solvents, and extends application of the couplings to installations subjected to chemical attack. A larger size coupling now extends the range of the line of a 2½-in. bore. A new type of spacer adapter increases the application range and can also serve as a demountable rigid extension of the motor shaft. *Link-Belt Co.*

Circle No. 28 on Readers' Service Card



Save Man Hours

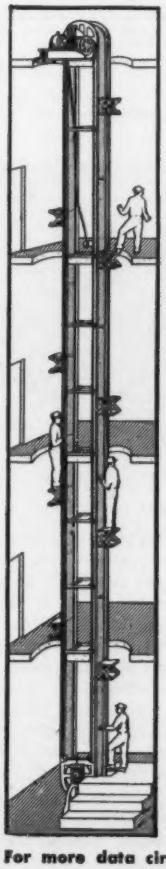
Equip Your Digester House with a

HUMPHREY

Employee's Manlift

ELEVATOR

Eliminate stair climbing — save time — reduce employee fatigue. The endless belt provides continuous up and down transportation to and from sampling and operating floors. Easy and safe to operate with ready-at-hand stop and go controls and the exclusive Humphrey Safety Features.



Can be installed in any Multi-Floor Building

Send us your requirements . . . we'll furnish complete information and prices.

HUMPHREY ELEVATOR COMPANY

Inc.

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Faribault, Minnesota

Humphrey is the original Manlift Elevator, made continuously since 1887.

For more data circle 151 on Post Card

HANCHETT TRAVELLING WHEEL TYPE KNIFE GRINDER

MODEL AK AUTOMATIC

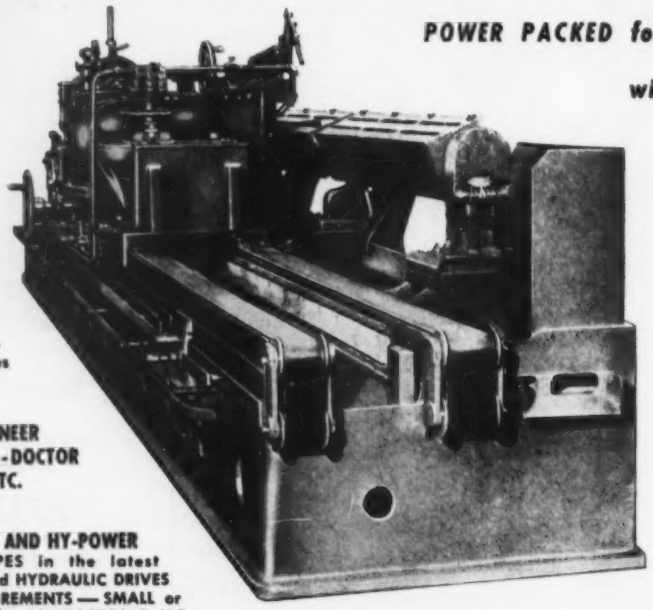
EXTRA HEAVY DUTY

SPECIFICATIONS

Capacity—84" to 396" lengths; Motors — 7½ to 40 H.P., Balanced; Drives — Mechanical - Hydraulic; Speeds—10' to 150 ft. per min.; Wheels—16"-20"-24" Dia.; Types — Cylinder - Segmental; Bearings — 100% Ball and Roller Types

FOR CHIPPER-HOG-PAPER-VENEER KNIVES-ROTARY CUTTERS-DOCTOR BLADES-SHEAR BLADES-ETC.

OTHER MODELS - DN - GK AND HY-POWER TRAVELLING TABLE TYPES in the latest MECHANICAL-ELECTRIC and HYDRAULIC DRIVES to meet ALL KNIFE REQUIREMENTS — SMALL or LARGE from 32" to 240" with MOTORS 3 H.P. up to 75 H.P.



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POWER PACKED for HIGH PRODUCTION with PRECISION ACCURACY

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WE GUARANTEE

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For more data circle 152 on Post Card

New Products . . .

Low-flow indicator

For flows down to 0.075 gpm (water) and ½ cfm (air or gas), this simple, reliable "ball type" indicator shows at a glance whether flow is taking place. The indicator is useful in applications such as air, steam, water, and oil purge lines to instruments and mechanical seals; cooling water to compressors, condensers; lubricating oil to bearings; and many others.

Made in ½-in. pipe size for pressures up to 100 psi, the Akron "ball type" flow indicator has a die-cast bronze body and comes with either a nylon or teflon ball. *McIntosh Equipment Corp.*

Circle No. 29 on Readers' Service Card

Chip-blanker

A new chip-blanker produces marketable chips from rough lumber just prior to final dressing by the planer. These wood chips are said to contain the desired fibre length and strength properties to make them a profit producing by-product for sale to pulp, paper and composition board industries. The attachment eases the load on planer-matchers, increases production flow, and improves lumber quality. Chip-blankers are available as sidehead chippers only, tophead chippers and combination sidehead and tophead chippers. *Stetson-Ross Machine Co. Inc.*

Circle No. 30 on Readers' Service Card

NEW LITERATURE

Booklets

CATALOG OF OCCUPATIONAL SAFETY MATERIALS, 1960 EDITION, a new 60-page publication, supersedes all earlier editions and should be used exclusively as a reference to materials, prices and ordering information. The catalog has been increased in size over 33 per cent in order to give fuller descriptions of materials and services. Organization of the categories of materials has been simplified to three sections: Administrative & Technical, Visual Aids & Training, and Safety Promotion Materials. These new features, just enumerated, are only a partial listing of incorporated improvements in the catalog's format. *National Safety Council*

PRESERVATION OF DOCUMENTS BY LAMINATION, a 20-page monograph, contains the results of an investigation of several aspects of the cellulose-acetate-film lamination process for restoring and preserving documents. Subjects covered include properties of an ideal laminating film, properties of cellulose acetate film, degradation of film and paper during lamination, preliminary studies of films other than cellulose acetate and specifications for archival laminating film formulated from cellulose acetate. This National Bureau of Standards Monograph No. 5 may be obtained, at 20 cents per copy, from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

USDA Reports

SOUTHERN PULPWOOD PRODUCTION, 1958, published as Forest Survey Release No. 82, is obtainable from the Southern Forest Experiment Station, U. S. Dept. of Agriculture Forest Service, New Orleans, La. Written by Joe F. Christopher and Martha E. Nelson, the 24-page booklet includes a discussion of pulpwood production by state and county, the increase in size and number of mills, and pulpwood movement and competition. Four graphs, six maps, three summary tables and 22 detailed tables supplement the text.

THE FOLLOWING TECHNICAL NOTES are obtainable from M. B. Dickerman, director of the Lake States Forest Experiment Station, U. S. Dept. of Agriculture Forest Service, St. Paul 1, Minn.: No. 568, Defect in Wisconsin Timber; No. 569, Timber Volume in Wisconsin Counties; No. 570, Mine-timber production declines as more substitutes are used and less ore is mined, Lake States, 1958; No. 571, How To Separate Damage by the European Pine Shoot Moth, the Zimmerman Pine Moth and the Pitch Mass Borer; No. 572, Blister Rust Spread is General in North, Local in South Wisconsin During 1958; No. 573, Production of Miscellaneous Timber Products—Lake States, 1958; No. 574, 1959 Forest Tree Seed Crop Generally Poor in the Lake States; No. 575, August-Collected Cones Yield Poor Red Pine Seed; No. 576, Soil Freezing Observations After Changes in Forest Cover; No. 577, Moisture Storage By Leaf Litter; No. 578, The Search for Resistance to Chestnut Blight in the Lake States.

STATION PAPER NO. 101 discusses the testing of a TBM Aerial Tanker in the Southeast for its effectiveness in retarding or suppressing test fires and for the determination of distribution and penetration patterns (through calibration tests) of slurry drops from a TBM in pine-timber types, with and without understory vegetation. Copies of this paper may be obtained from Joseph F. Pechanec, director of the Southeastern Forest Experiment Station, U. S. Dept. of Agriculture Forest Service, Asheville, N. C.

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

Hardness conversion chart

Babcock & Wilcox Co., Tubular Products Div., welcomes your request for a chart which shows the approximate relation between hardness by various testing systems and tensile strength of carbon and alloy steels. The hardness systems covered are Brinell, Monotron, Vickers, and Rockwell (B, C & E scales) and Scleroscope.

Circle No. 31 on Readers' Service Card

Rotoformer bulletin

Sandy Hill Iron & Brass Works has published an 8-page bulletin on the Rotoformer, a machine having features similar to the fourdrinier and other features like the cylinder mould vat; but for simplicity of operation, economy in space, and control of physical characteristics of the sheet, the Rotoformer is said to have points of superiority over either. The bulletin gives technical data, design features, and is richly illustrated with many photographs and schematic diagrams.

Circle No. 32 on Readers' Service Card

Movie on abrasion

Norton Co., as part of the celebration of its 75th anniversary, has just released a new motion picture film which is designed for showings to a variety of general audiences throughout the country. This 16 mm sound film in color, "Old As The Hills," tells the story of abrasion as a phenomenon of Nature and the uses to which Man has applied abrasion and abrasives from the dawn of history to the present. The film, booked free upon request, also shows how abrasives and the ceramic materials made with abrasive materials play an important role in making just about every manufactured product today.

Circle No. 33 on Readers' Service Card

Jetslingers

Link-Belt Co. has published a six-page folder, available on request, which describes three types of Jetslingers (machines equipped with short, high-speed belt conveyors for hurling free-flowing bulk materials into areas inaccessible by other mechanical means). The folder describes and illustrates both the suspended, swiveling and wheel-mounted units which are used for hurling materials into storage in warehouses, boxcars, holds of ships, bins or upon the ground. Dimensional data is also given.

Circle No. 34 on Readers' Service Card

Psychrometric chart

J. O. Ross Engineering, a Division of Midland-Ross Corp., welcomes your request for their newly edited Psychrometric chart. This expanded chart now goes to 350°F. dry bulb temperature.

Circle No. 35 on Readers' Service Card

Reprinted management article

Eddy-Rucker-Nickels Co. is offering the reprint of an article, "Making Incentives Work," by Frances Torbert (Prof. of Management at San Diego State College). In this 12-page article, available upon executive request, Prof. Torbert points out various problems encountered in the use of individual incentives for increased acceptance of the goals of business. The article also includes a summarization of several Plantwide programs.

Circle No. 36 on Readers' Service Card

Digesters and related equipment

Bauer Bros. Co. welcomes your request for a 12-page booklet which describes their complete line of digesters and related equipment to meet all pulp cooking requirements. Three digesters are explained in detail; the rapid cycle batch cooker, the M & D model and the Grenco model. Information is also included on the Bauer-Grenco rotary valve for continuous digesters and automatic controls. In addition, the booklet contains installation photos, schematic drawings, operating data, capacity and advantages of each unit.

Circle No. 37 on Readers' Service Card

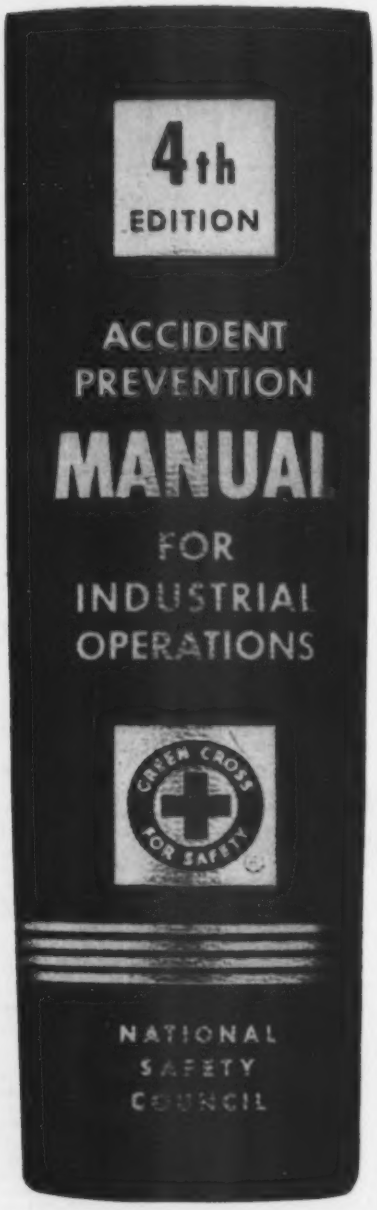
Stationary compressor

Joy Mfg. Co. welcomes your request for a new 24-page bulletin which describes the WN-114 stationary compressor. The booklet includes specifications on three basic models of the semi-radially constructed units ranging from 1385 to 1948 cfm at 125 psi Vital information on "package" design, components, intercooling, lubrication, motor mountings and accessories are fully illustrated and explained.

Circle No. 38 on Readers' Service Card

Rotex screener catalog

Orville Simpson Co. has published a new 32-page catalog which contains complete and detailed information on Rotex screeners and their various applications in industry. A comparative-opening reference table for silk, nylon and wire-screen cloth has been expanded to include nylon bolting cloth, stainless-steel light wire screen and the U. S. standard testing screen series. The bulletin is illustrated with



The new *4th Edition of the Accident Prevention Manual* contains over 1500 pages, over 500 illustrations and photographs—was reviewed by nearly 400 safety specialists from all industries before publication. It's the most complete, most accurate, most up-to-date safety manual available.

Single copy price $15.50. Use this stock number (121.51) when ordering.

NATIONAL SAFETY COUNCIL

425 North Michigan Ave., Chicago 11, Illinois

For more data circle 153 on Post Card

photographs and schematic diagrams that show specific screener models, installation and maintenance procedures, accessories, etc.

Circle No. 39 on Readers' Service Card

"Pro-Fax" booklet

Hercules Powder Co. has published a 20-page booklet containing technical information on the most widely used polypropylene, "Pro-fax." Information on physical characteristics, mechanical properties, chemical resistance, electrical properties, and on injection molding, extrusion and fabrication, is supplemented with tables, charts, photographs and descriptions of commercial applications. The various types of "Pro-fax," packaging and shipping data, and a bibliography of other Hercules information on polypropylene, is included in the booklet.

Circle No. 40 on Readers' Service Card

Ultra-V drive bulletin

T. B. Wood's Sons Co. welcomes your request for a 36-page bulletin on their line of Ultra-V drives. The bulletin includes drive-selection tables for stock and non-stock sheaves, horsepower tables, nomograms for service-level comparisons of drive costs, sheave and belt specifications, installation instructions for "Sure-Grip" sheaves, information on how to check the tension of an Ultra-V drive, etc.

Circle No. 41 on Readers' Service Card

Speech reprint

Eddy-Rucker-Nickels Co. has published the reprint of Allen W. Rucker's speech on labor-time versus labor-dollar savings. This paper explores the consistent, relative reduction of prices with respect to wages in our manufacturing industry. It shows that the consumer, as well as the wage and salary earners, benefit from advancing technological productivity. Copies of the six-page reprint are available upon executive request.

Circle No. 42 on Readers' Service Card

Guar gum booklet

Stein Hall & Co. Inc. is offering a new 16-page edition of a booklet which contains additional information about the physical and chemical properties of *Jaguar* (guar gum) gained by Stein Hall since 1956, when the first edition was published. New sections contain such information as *Jaguar's* viscosity vs. shear rate, electrolyte compatibility, its properties as a settling, filtering and flotation agent and the effect of temperature on viscosity.

Circle No. 43 on Readers' Service Card

Fluff tester

Testing Machines Inc. has announced the availability of a 3-page brochure which describes the new P. A. T. R. A. Fluff tester. This tester was developed by the Printing, Packaging and Allied Trades Assoc., Surrey, England, after it was seen that a large quantity of fluff was removed from paper when the paper was passed through the printing machine in contact with a dry blanket. This principle has been used in the construction of the tester.

Circle No. 44 on Readers' Service Card

Submersible pumps

Sier-Bath Gear & Pump Co. Inc. is offering a four-page folder which outlines many cost-saving advantages of submersible rotary pumps in storage tank service. The folder describes several typical installations and gives details of types, capacities and construction of rotary pumps available.

Circle No. 45 on Readers' Service Card

Technical article reprint

Sprout, Waldron & Co. Inc. has reprinted a technical article, available upon request, which describes auxiliary or supplemental values obtainable from pneumatic conveying. The article discusses heat transfer, cooling and drying, size reduction and size separation. The point of the paper is that there are many auxiliary uses of pneumatic conveyors which can frequently provide the necessary economic justification for a system which would otherwise be considered too costly.

Circle No. 46 on Readers' Service Card

The Paper Industry
Professional and Business Services

J. E. SIRRINE COMPANY
ENGINEERS Since 1902
GREENVILLE, SOUTH CAROLINA

Design — Consultations
Paper & Pulp — Reports
Water & Waste — Appraisals
Steam & Hydro Power — Steam Utilization

Deep hole drills

Pratt & Whitney Co, Inc. welcomes your request for a four-page circular which describes their line of deep hole drills. The illustrated circular gives specification tables and a general descriptive background on this product line.

Circle No. 47 on Readers' Service Card

Catalog on surfactants

Onyx Oil & Chemical Co. is offering a new 24-page catalog of surface active agents. Each product is described by trade name, active ingredient, per cent activity, physical state, general use, specific applications and properties. The products are divided into three general classes: anionic, cationic and non-ionic. There is a two-page section included which explains the chemistry of each of these groups.

Circle No. 48 on Readers' Service Card

Microbiological control services

Betz Laboratories Inc, is offering a four-page bulletin which describes the services offered by this organization in microbiological control in pulp and paper mills. The bulletin covers facilities and methods of operation in this specialized field.

Circle No. 49 on Readers' Service Card

High-velocity dryer

J. O. Ross Engineering, a Division of Midland-Ross Corp., welcomes your request for a 4-page bulletin which gives technical data on three new high-velocity dryers. Air outlet velocities range from 15,000 to 20,000 ft./min., with temperatures to 800° F. and beyond in certain applications. Dryers may be manually or automatically controlled and are said to be extremely flexible in operation.

Circle No. 50 on Readers' Service Card

Corrosion resistance rating guide

Hydromatics Inc. is offering an 8-page guide which lists the relative ability of metals, plastics and synthetic rubbers used in the manufacture of Flo-Ball valves to resist the corrosive effects of 390 different fluids encountered in industry. An easy-to-read tabulation permits a rapid estimate of the effect of the fluids, alphabetically arranged, on selected materials of construction. The metals are aluminum, carbon steel, semi-steel and 316 stainless steel; the synthetic rubbers are Buna N, Neoprene and Viton A; the plastics are Teflon, Nylon and Kel-F.

Circle No. 51 on Readers' Service Card

CLASSIFIED ADVERTISING

RETIRING?

Add to your retirement income by making your paper mill knowledge pay off. Spare time. No selling. Write Box 690, The Paper Industry.

HELP WANTED

Paper chemist with mill experience in paper and coating wanted for technical sales service. Willing to travel as required. Send resume, photograph and salary required. Replies will be treated in strict confidence. Box 696, The Paper Industry.

STATIC ELECTRICITY steals profits, causes fires and explosions! Kill it with inexpensive, trouble-free Static Eliminator Brushes. Fully guaranteed—thousands in use. Send for free illustrated folder today. Western Brush Co., Dept. P., 215 S. Western Chicago 12, Illinois.

Chemical sales service representative to call on New England paper mills for established chemical company. Reply giving education and background to Box 697, The Paper Industry.

CHARLES P. RAYMOND SERVICE, Inc.

Servicing paper and pulp mill employers seeking new executives and executives seeking positions. We invite your inquiries. Phone LI 2-6547 — 294 Washington Street — Boston 8, Mass.

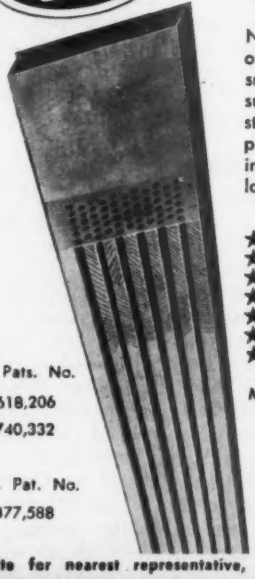
WANTED
MACHINE DESIGN ENGINEERS

With talent in area of automatic machinery. This is primarily board work position concerned with design of hardboard processing and automatic handling equipment. Give experience and salary range with application. Location south. Write Box 698, The Paper Industry.

MAPLE END-OF-GRAIN SLOTTED

WIRE LO-VAC SAVER

SUCTION BOX COVER



Natural characteristics of end-of-grain Maple provides a smooth, even, long wearing surface. Famous LOVAC construction features laminated plastic cross members supporting the end-of-grain Maple lands to eliminate sag.

★ ELIMINATES STREAKING
★ LESS PINHOLES
★ LESSENS CLOGGING
★ GIVES LONGER WIRE LIFE
★ EVEN VACUUM
★ BETTER FIBRE FORMATION
★ BETTER TENSILE STRENGTH

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2,740,332

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OF
RES-LIN
AND
MET-AL-RIB
SUCTION BOX COVERS

Write for nearest representative, data sheet and literature.

APPLETON WOOD PRODUCTS CO. APPLETON · WISCONSIN

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AIR LOADED — POSITIVE LOCKING

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assume full responsibility for operation of the Atlanta plant, which produces multi-unit packaging materials, bottle carriers, folding boxes, packaging machinery and merchandising materials. Garner was formerly treasurer of the company.

Patton Mfg. Co.

Herman Levin, formerly director of engineering for Pusey & Jones, has recently been appointed to the position of field engineer for the Paper Mill Machinery Division. He will be calling on papermakers in an engineering and sales capacity to assist in their improvement programs.

H. Levin

W. Herbert

T. Detcher

J. A. Perry

Black-Clawson Co.

Jack A. Perry will now be serving Black-Clawson as a technical sales service engineer with the Dilts Division. He will make his headquarters at the Dilts plant in Fulton, N.Y., and will specialize in sales and service of Dilts on- and off-machine coating equipment for paper mills and converting plants.

Theodore Detcher has joined the Pandia Division of B-C. He will serve as assistant sales manager. He will specialize in the sales and application of new pulping processes for Pandia digesters in the field of high-grade pulp manufacture.

William Herbert has also joined the Pandia Division to serve as assistant chief engineers.

Southworth Machine Co.

Leslie S. Pearson, newly elected vice president will now manage the new paper mill division for the company. He joined the company 18 months ago from S. D. Warren Co.

Necrology

Vinson Krapfel

Vinson Krapfel, 51, was director of purchases of Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis. Before joining Consolidated's staff in 1943, where he was named director of purchases in 1945, Krapfel was self-employed in Madison as a wholesale lumber dealer. He has served as president of Hotel Mead since it was opened in 1951, and was elected vice president of Wisconsin Paper Group in February of this year. Krapfel has also been vice president of Thiele Kaolin Co., Sandersville, Ga., since 1950.

Harold J. Michel

Harold J. Michel died March 22 after an extended illness. He was vice president and general manager of the Film Division of American Viscose Corp. Michel joined AVISCO in 1946 as manufacturing superintendent of the Lewistown, Pa., rayon plant. He was later named plant manager. In 1949 he was transferred to Marcus Hook, Pa., as plant manager. He became general manager of the Film Division in 1955 and elected a vice president in 1958.

Louis Hoff

Louis Roydon Hoff, 83, Bronxville, N. Y., retired vice president of Johns-Manville Corp., still remained active in building industry activities. A graduate of New York University, Hoff served in the Spanish-American war. Joining the staff of H. W. Johns Mfg. Co. after his return to civilian life, Hoff remained with the company, which became Johns-Mansville in 1900, and became general sales manager in 1913. In 1926, he was made president of the Johns-Manville Sales Corp. Among his activities after retirement, Hoff was a sales consultant on trade associations for Johns-Manville.

Edgar Linden, Sr.

Edgar A. Linden, Sr., 70, of Salem, Oregon, had recently retired from the executive post at Oregon Pulp & Paper Co., Salem. Linden was widely known in the Willamette valley's lumber and building industry, having served as manager of the Salem mill's lumber division for many years. Besides being a former member of the Oregon Pulp & Paper Co.'s board of directors, he was also on the advisory board of the Bureau of Land Management and director of the Willamette Valley Lumber Operator's Assn.

William Repley

William L. Repley, 66, retired general manager of Warren Pumps Inc., died on March 14 at his home in West Freeport, Maine. He retired in 1958, after 32 years of service with Warren.

Charles William Howarth

Charles William Howarth was president of Columbia Box Board Mills Inc. in Chatham, N. Y. He held this office since 1943. He also held the position of superintendent at the company's Mellenville Division. Howarth had been actively engaged in the paperboard industry for over 45 years. He was a former director of the National Paperboard Association. Howarth's sons are also employed with Columbia. Robert R. is serving as executive vice president and Charles H. is a member of the sales department.

Walter P. Paepcke

Walter P. Paepcke, chairman of the board and chief executive officer of Container Corp. of America died April 13 after a brief illness. Paepcke was known throughout the packaging, financial, design and cultural worlds for his innovations and his individualistic ideas. In 1926 at the age of 29, he founded Container Corp. of America. The company's growth was rapid. Sales went to $11.7 million in the first year and by the early 1930's, mergers with many other producers of packaging and established for the company a solid and strategic foothold in key population centers. In 1946, Paepcke was elected chairman and chief executive officer.

John Gafaell

John E. Gefaell, 69, N. Y. C. retired as a newsprint executive in 1955. Graduating from the Univ. of Wisconsin in 1912, Gefaell first worked at the Austro-Hungarian Embassy in Washington and then with the Interstate Paper Co., where he was sales manager and a company officer. At Parsons & Whittemore Inc., he was vice president in charge of sales. In the period 1935 and 1936, he and Lynn Aldrich of Chicago bought the assets of the Great Lakes Paper Co. Ltd., Fort William, Ont., and reorganized the company under the same name. Gefaell was vice president and sales manager of the reorganized company when he retired in 1955.

MARKET QUOTATIONS

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.b. New York:

	per cwt.
No. 1 white shirt cuttings	13.00— 13.50
Soft unbleached muslins	15.50— 16.00
Fancy shirt cuttings	4.50— 5.00
No. 1 percales	5.50— 6.00
No. 1 washables	2.25— 2.50
No. 1 light silesias	6.50— 7.00
No. 1 light prints	4.75— 5.00
Light flannelettes	6.50— 7.00
Cottonades	2.75— 3.25
Blue overall cuttings	6.75— 7.25
Blue cheviots	6.75— 7.25
Canton flannels, bleached	10.50— 11.00
Canton flannels, unbleached	10.50— 11.00
Osnaburg cuttings	9.50— 10.50
Underwear cuts, bleached	14.50— 15.00
Underwear cuts, unbleached	14.50— 15.00
Sun tan khaki cuttings	5.00— 5.50
American linen cuttings	6.75— 7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.
No. 1 roofing (Chicago)	.50— .55
No. 2 roofing (Chicago)	.40— .45
Twos and blues, repacked	1.75— 2.00
Thirds and blues, repacked	1.50— 1.75
No. 1 whites, repacked	—
No. 1 whites miscellaneous	—
No. 2 whites, repacked	—
No. 2 whites, miscellaneous	—

RAGS (Foreign)

(ex dock New York City)

New Rags

	per cwt.
New dark cuttings	Nominal
New mixed cuttings	
New light silesias	
Light flannelettes	
Unbleached cuttings	
New white cuttings	
New light oxfords	
New light prints	

Old Rags

	per cwt.
No. 1 white linens	Nominal
No. 2 white linens	
No. 3 white linens	
No. 4 white linens	
No. 1 white cottons	
No. 2 white cottons	
No. 3 white cottons	
No. 4 white cottons	
Extra light prints	
Ordinary light prints	
Medium light prints	
Dutch blue cottons	
French blue cottons	
French blue linens	
Checks and blues	
Linsey garments	
Dark cottons	
Old shopperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

Gunny No. 1, domestic	—
Gunny No. 1, foreign	—
No. 1 manilla rope, domestic	—
No. 1 manilla rope, foreign	—
New burlap cuts (soft)	—
Sisal strings	—
Mixed strings	—

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	95.00—100.00
No. 1 hard white shavings	80.00— 85.00
No. 1 soft white shavings	50.00— 55.00
Soft white shavings, uncoated	60.00— 65.00
Fly leaf shavings No. 1	30 00— 35.00
Fly leaf, woody, No. 1	25.00— 27.50
Mixed colored shavings	21.00— 23.00
No. 1 books and magazines	18.00— 20.00
Ledger stock, white, No. 1	45.00— 50.00
Ledger stock colored, No. 1 (Midwest ship)	35.00— 40.00
New manila envelope cuttings (free of groundwood)	65.00— 70.00
New manila envelope cuttings (containing groundwood)	45.00— 50.00
Manila tab cards	60.00— 65.00
Colored tab cards	47.50— 50.00
New northern kraft envelope cuttings	65 00— 70.00
Triple sorted kraft, 100%	35.00— 37.00
No. 1 old kraft	25.00—
White news cuts, No. 1	45.00— 50.00
No. 1 overissue news	15.00— 17.00
Folded news, special	13.00— 14.00
Folded news, ordinary	11.00— 12.00
Old corrugated boxes	18.00— 19.00
New jute corrugated cuts	19.00— 20.00
Mill wrappers	11.00— 13.00
Boxboard cuttings	4.00— 5.00
No. 1 mixed paper	6.00— 8.00

CHEMICALS

F.o.b. New York City

Alum, ammonium	
Granular, bags, works, cwt.	4.30—
Lump, drums, works, cwt.	5.05—
Powdered, drums, works, cwt.	5.20—
1-Arginine, drums, kilo	90.00—
Blanc Fixe	
Direct process, bags, c.l., works, ton	145.00—
L. c. l., ton	155.00—
Bleaching Powder, drums, cwt.	—
Casein, domestic acid precipitated	
30-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.56—
80-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.64—
China Clay, domestic dry-ground, airfloat, 99%	
325-mesh bags, c.l., Georgia works, ton	10.00— 12.00
300-mesh bags, c.l., Georgia works, ton	13.50— 14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	20.00— .35.00
Chlorine, liquid	
Tanks, single units, works, freight equaled, cwt.	3.25—
Glycerine, refined (CP, USP) 99%, drums c. l., delivered lb.	.30⅞—
Litharge, commercial powdered	
Barrels, c. l., works, freight equaled lb.	.13¾—
Rosin, gum, c. l., f.o.b. New York, cwt.	
K, M	13.50—
N	13.85—
WG	14.00—
WW	14.50—
Rosin, wood, c. l., f.o.b., shipping point, cwt.	
K, M	12.00— 12.25
N	12.35— 12.45
WG	12.55—
WW	12.75— 12.85
Saltcake, domestic, bulk works, 100% Na_2SO_4 basis ton	28.00—
Soda Ash	
Dense, 58%, paper bags, c.l. works, cwt	1.90—
Light, 58%, paper bags, c.l. works, cwt	1.85--
Soda, caustic	
Flake, 76%, drums, c. l. works, freight equalled, cwt	5.20—
Solid, 76%, drums, c. l. works, cwt.	4.80—
Sodium Silicate	
40°Be, 1:3.2, turbid, drums, c. l., works, cwt.	1.65—
52°Be, turbid, 1:2.4, drums, c. l., works, cwt.	2.65—
Starch	
Pearl, 140-lb. bags, cwt.	7.51—
Pearl, 100-lb. bags, cwt.	7.36—
Powdered, 100-lb. paper bags, cwt.	7.48—
Sulfur, crude	
Bulk, c. l. mine, contract, long ton	23.50—
Talc	
Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—
Canadian, ground, bags, c. l. works, ton	20.00— 35.00
Titanium Pigment	
Calcium-rutile base, regular, bags, c. l., lb.	.09⅜—
High-tinting, drums, c. l., lb.	.14⅜—
Zinc Oxide Pigment, American process	
Lead-free, bags, c. l. freight allowed, lb.	.14½—
Leaded, 35%, bags, c. l., freight allowed, lb.	.15⅜—

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	155.00—
Bleached sulfite, Canadian	155.00—
Unbleached sulfite	135.00—
Unbleached sulfite, Canadian	135.00—
Bleached soda	150.00—
Bleached soda, Canadian	150.00—
Kraft, bleached hardwood	152.00—
Kraft, bleached	157.00—
Kraft, bleached southern	160.00—
Kraft, bleached Canadian	160.00—162.50
Kraft, unbleached southern	120.00—
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	135.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft, semi-bleached southern	—
Sulfite screenings	—
Sulfate screenings	—

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite Swedish, freight allowed	155.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	155.00—
Bleached sulfite, Finnish, freight allowed	155.00—
Unbleached sulfite, Swedish, freight allowed	135.00—
Unbleached sulfite, Finnish, freight allowed	135.00—
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft, bleached, Swedish, on dock	157.50—162.50
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	107.50
News vat lined chip	110.00
.009 chip, rolls	100.00
Filled news	111.50
Solid news	114.50
White vat lined chip	144.50
Chip tube and can stock	112.50
Single manila lined chip	162.50
Single jute lined chip	147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	2.68
White patent coated	
.020	175.00
.018	177.50
.016	182.50

Book Paper (f.o.b. Chicago, c.l. cases per cwt):	
No. 1 enamels	20.55
No. 2 enamels	19.55
Machine-coated, 45- to 100-lb.	15.55— 19.00
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	22.25
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	21.10
Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	—
75% "	—
50% "	—
25% "	—
Rag Content Ledger (white, 5000 to 10,000 lb., ream sealed cartons):	
100% rag	—
75% "	—
50% "	—
25% "	—
Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	
No. 1	—
No. 2	—
No. 4	—
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	—
No. 2	—
No. 4	—

Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials

Kraft Wrapping — Natural (standard rolls 9- and 15-in. diam.)	per cwt
70-lb. and heavier	9.00
60-lb	9.25
50-lb.	9.35
40-lb.	9.75
35-lb.	10.25
30-lb.	11.00
25-lb.	11.75
20-lb.	12.75
No. 1 Kraft Butcher — Pink	per cwt
40-lb. only	10.50
(Sheets — Plus 50c cwt)	

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Twin	——(16- 18)	——(18- 21)	——(21- 25)

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.....(C) SAN JOSE-SANTA CLARA	Container Corporation of America International Paper Company

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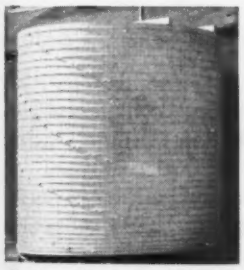

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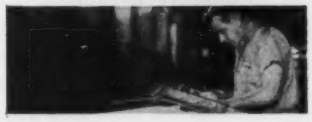

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Performance of adhesives primary consideration

The modern packager has learned that, even from economic considerations, the efficiency, coverage, or mileage of an adhesive is more important than its cost, according to E. C. Lentz of Morningstar-Paisley Inc.

Modern adhesives are responsible for production speed-up and decrease of expensive downtime. An additional labor-saving technique that can be adopted with modern adhesives, which retain the flow characteristics over prolonged periods, involves the piping of adhesives from a central storage unit instead of handling it in gluepots.

Coulometric analysis

A coulometric analytical method and a coulometric-titration coulometer — each providing a precision of 1 part in 100,000 — have been developed by the National Bureau of Standards.

Coulometric analyses are simpler, quicker and easier to perform than many of the corresponding gavimetric and volumetric determinations. The method is based on the exact relationship between the amount of electricity used in an electroanalysis and the amount of chemical reaction produced. In conventional volumetric analysis, the unknown sample is titrated by adding a chemical reagent; in electroanalysis, electrons act as the reagent and are easily measured.

Packaging in the Sixties

The packaging industry is expected to double in size in the 1960's — increasing from an annual volume of $16 billion at the beginning of the decade to $35 billion at its close, according to T. W. Sharp of Union Carbide Plastics Co.

This growth will be realized as a result of (1) increased efforts in market and product development; (2) automated packaging lines; (3) reduction of packaging costs; and (4) attracting top personnel into the packaging field.

Algae and slime control

As a result of a 15-year cooling tower experience, C. D. Carlson of Dow's Texas Division has concluded that sodium pentachlorophenate, or formulations containing blended cholorophenates as the main ingredients, are superior to all other agents tried in the past, including chlorine, in cooling tower protection and control of all algae and slime. The main advantages of sodium pentachlorophenate over chlorine are (1) lower net costs; (2) greater effectiveness; and (3) actual surface protection of wood as contrasted to the delignification hazard of chlorine.

Emphasis on light-weight papers

Demand for light-weight papers in 1960 and in the following years will increase faster than for any other major category of paper or paper products, according to George W. McCleary of Ecusta Paper.

Light-weight paper sales increased 27 per cent in 1959, compared to an overall increase of 10 per cent for all paper and paperboard products. The current popularity of light-weight papers is derived from the fact that they now match or surpass the strength and opacity of many heavier papers and have outstanding printability.

. . THE MULLIS THIN LINE LOG SKINNER WILL DEBARK LOGS AS SMALL AS 3" IN DIA. AND AS SHORT AS 4 FT. LONG

This is the finest most versatile debarker ever built—efficiently debarks every log — 4 feet to tree length — straight or crooked—clear or knotty—wet or dry—winter or summer. The Mullis Log Skinner will debark more logs per day under actual Sawmill conditions ! ! !

INCREASE YOUR MILL PROFITS on every log — CUT MILL MAINTENANCE COSTS — Put the tried and proven debarker to work in your mill; the Mullis Log Skinner is outselling every other make of ring-type debarker.

The Mullis Log Skinner is leading in sales because it has been proven by lumbermen to cost less to buy, install, operate and maintain—it out produces other debarkers, does a better job and is more versatile, yet costs less in every way. This is the FINEST debarker available ! ! ! regardless of cost.

Call, wire or write today for full information and a New THIN-LINE Log Skinner booklet — Call us Collect — NOW—Lancaster, S. C. 4131 for information, lumbermill engineering assistance or for a representative to come to your mill. You will be under no obligation to us—we'll be obliged to you, so call now!

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THIN LINE LOG SKINNER

CARL W. MULLIS

ENGINEERING and MANUFACTURING COMPANY

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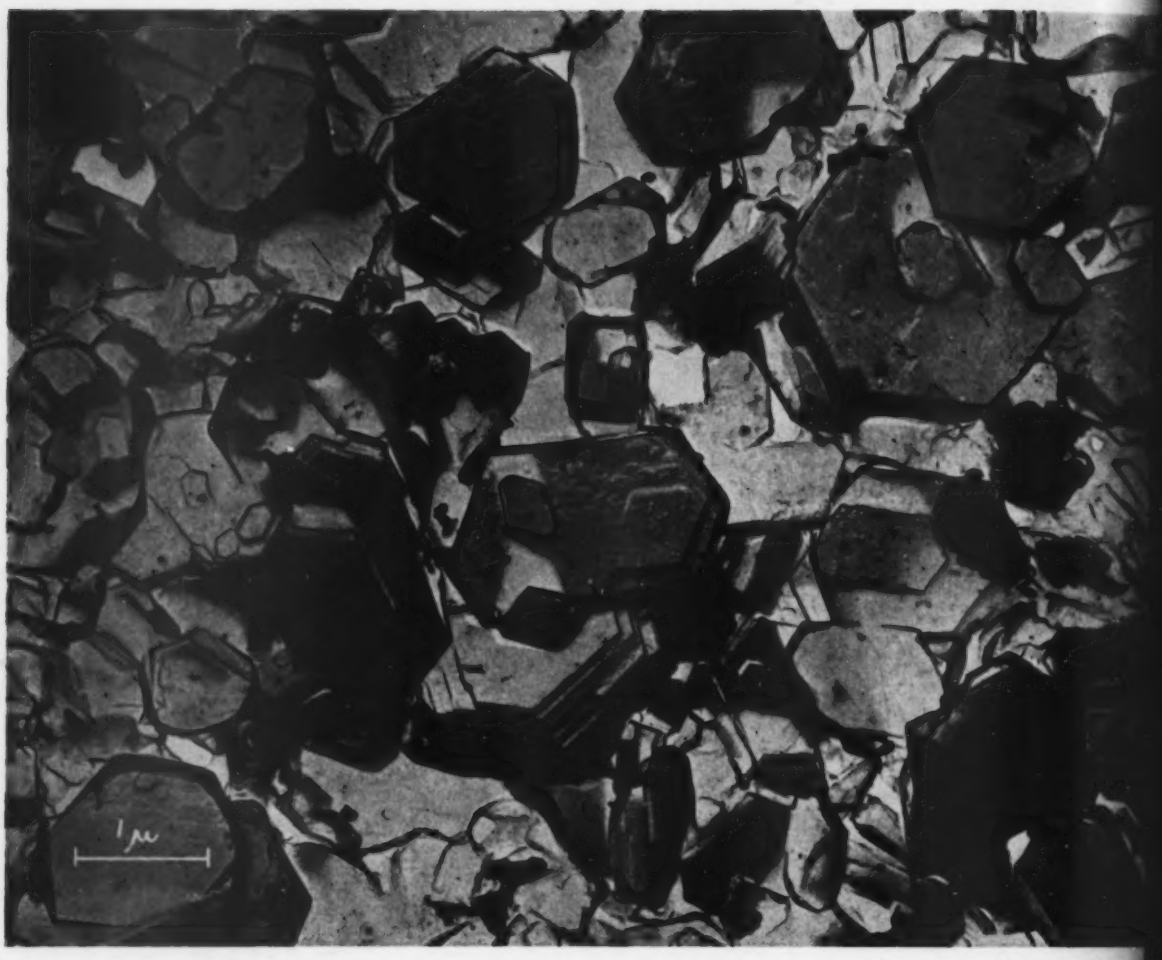

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Unlocking the secrets of kaolin with the electronmicroscope

Among the many mysteries of printability is the actual relationship of the various kaolin particles to the adhesive at the surface of the sheet. In helping paper mills to solve such mysteries, Georgia Kaolin has been instrumental in developing electronmicrographic techniques for the study of paper surfaces. This photograph, typical of the results of such efforts, reveals the structure, arrangement and behavior of kaolin particles on a sheet of coated paper.

Every day the knowledge gained through the use of electronmicroscopes, X-ray spectrometers and other modern instruments by the GK Research Laboratories is helping solve problems that have direct bearing on the uniformity, quality and performance of your present products. Of equal, if not greater importance, is the value of this work to your new product development program.

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